



User Manual

ProfiTrace 2.5

PROFIBUS Combi-Analyzer on USB

PROFIBUS analyzer with powerful statistics
Suitable for PROFIBUS DP and PA
High-speed digital oscilloscope
Bar graphs
Topology scan
DP master
Reporting
OPC server
PROFIBUS to USB interface
Runs on XP, Vista and Windows 7 platforms

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Safety Guidelines

This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as follows according to the level of danger:



Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warning

This device and its components may only be used for the applications described in this manual and only in connection with devices or components that comply with PROFIBUS and RS 485 interface. This product can only function correctly and safely if it is transported, stored, set up, installed, operated and maintained as recommended.

The ProfiCore Ultra is a CE class A product. In a domestic environment it may cause radio interference in which case the user may be required to take adequate measures.

Disclaimer of Liability

We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and necessary corrections will be included in subsequent editions. Suggestions for improvements are welcome.

PROCEN TEC
Turfschipper 41
2292 JC WATERINGEN
The Netherlands

Tel.: +31-(0)174-671800
Fax: +31-(0)174-671801
Email: info@procentec.com
Web: www.procentec.com



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Fax: +31-(0)174-671801
Email: info@procentec.com
Web: www.procentec.com

Important Information

Purpose of the Manual

This user manual provides information how to work with ProfiTrace 2.

Recycling and Disposal

The parts of the ProfiCore Ultra can be recycled. For further information about environment-friendly recycling and the procedure for disposing of your old equipment, please contact:

*PROCEN^{TEC}
Turfschipper 41
2292 JC WATERINGEN
The Netherlands*

*Tel.: +31-(0)174-671800
Fax: +31-(0)174-671801
Email: info@procentec.com*

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- By phone at +31-(0)174-671800
- By fax at +31-(0)174-671801
- By email at support@procentec.com

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1 Product description

1.1 Introduction

ProfiTrace 2 is the most powerful analyzer for PROFIBUS networks. It is the latest generation in the line of busmonitor technology because it combines all primary tools in one:

- Analyzer
- Oscilloscope
- Bar graph
- Topology Scan
- DP Master

Technicians can check and troubleshoot the complete PROFIBUS network with 1 software package and 1 piece of hardware.

An enormous reduction in equipment, weight, costs and required knowledge.

The advanced USB hardware (ProfiCore Ultra) is internally equipped with a high-speed digital oscilloscope and able to capture bus signals running at 12 Mbps. It can also be used on PROFIBUS PA installations with the PA Probe Ultra.

ProfiTrace is an essential tool for maintenance, commissioning and troubleshooting as well as product development. Typical failures such as noise, reflections, voltage drops, termination problems, double addresses, wire breaks and configuration faults are easily identified. Random errors such as overshoots, error telegrams, repeats and diagnostics can also be captured and logged. The results can be exported to detailed reports which are accepted by the industry. Predictive maintenance and asset management are really possible with ProfiTrace!

This revolutionary tool has been developed because of technological limitations of other available tools on the market. The service team of PROCEN TEC was frequently forced to invest heavily in interface cards and eventually could no longer accept the frustrations of PC locked licenses. That the prices of the tools are relatively high and the displayed information is too complex was another contributing factor. Therefore PROCEN TEC decided to initiate the development of a tool that was ideally suited to our needs and those of the end-user.

This outstanding tool that fits in your pocket will boost the capabilities of service, maintenance and engineering technicians.



1.2 Product features

- ✓ **Busmonitor with powerful statistics**
Enhanced version of ProfiTrace 1: *Repeats, Fall-outs, Corrupted messages, Diagnostics, Cycle time, etc.*
- ✓ **High-speed digital oscilloscope**
Differential voltage, A-line, B-line, Noise, Overshoots, Reflections, Triggers.
- ✓ **Bar graphs**
Average, Min. and Max. values of the bus signals per device.
- ✓ **Topology scan**
Automatic generation of the network topology.
- ✓ **Reporting**
Automatic generation of detailed reports that are accepted by the industry.
- ✓ **DP-V0/V1 master**
ProfiCaptain 1 has been completely integrated with even more features.
- ✓ **ProfiCore Ultra USB interface**
Useable on PC platforms, no power supply required and elimination of spur lines.
- ✓ **DP and PA**
The PA Probe Ultra enables measurements on PA segments.
- ✓ **OPC server**
- ✓ **Runs on XP, Vista and Windows 7 platforms**

1.3 Application areas

- ✓ **Troubleshooting & Maintenance** of PROFIBUS networks (*ProfiTrace, ScopeWare, Topology scan and ProfiCaptain*).
- ✓ **Commissioning** of PROFIBUS networks (*ProfiTrace, ScopeWare, Topology scan and ProfiCaptain*).
- ✓ PROFIBUS **product testing** and verification (*ProfiTrace, ScopeWare and ProfiCaptain*).
- ✓ Passive **cable testing** (*ScopeWare and ProfiCaptain*).
- ✓ **I/O testing** of PROFIBUS devices (*ProfiCaptain*).
- ✓ **Address setting** of PROFIBUS devices (*ProfiCaptain*).
- ✓ **Education.**

1.4 Detectable faults on PROFIBUS DP

ProfiTrace 2 can be used to detect almost all faults in PROFIBUS DP networks. The table below describes the sub-programs you need to find specific faults.

Faults on DP	Passive cable (No devices connected)	No master active (Slaves are connected)	Running installation
General communication faults		ProfiCaptain + ProfiTrace	ProfiTrace
Double address		ProfiCaptain + ProfiTrace	ProfiTrace
Wrong address		ProfiCaptain	ProfiTrace
Missing device		ProfiCaptain	ProfiTrace
Device diagnostics		ProfiCaptain	ProfiTrace
Configuration faults		ProfiCaptain	ProfiTrace
No termination	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
Too many termination	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
Powerless termination	ScopeWare	ScopeWare	ScopeWare
Spur lines		ProfiCaptain + ScopeWare	ScopeWare
Short-circuit, break, crossed wires	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
Cable too long	ProfiCaptain + ScopeWare	ProfiCaptain + ScopeWare	ScopeWare
EMC/noise problems	ScopeWare	ScopeWare	ScopeWare
1 Meter rule		ProfiCaptain + ScopeWare	ScopeWare

1.5 Detectable faults on PROFIBUS PA

ProfiTrace 2 in combination with the PA Probe Ultra can be used to detect almost all faults in PROFIBUS PA networks. The table below describes the sub-programs you need to find specific faults (it is assumed that the PA network has a link+coupler and the ProfiTrace is connected to the PA segment):

Faults on PA	Running installation or a link that communicates autonomously
General communication faults	ProfiTrace
Double address	ProfiTrace or ScopeWare
Wrong address	ProfiTrace
Missing device	ProfiTrace
Device diagnostics	ProfiTrace
Configuration faults	ProfiTrace
PROFIBUS DP connection failure	ProfiTrace
Bad status byte	ProfiTrace
No termination	ScopeWare
Too many termination	ScopeWare
Short-circuit, break, crossed wires	ScopeWare
EMC/noise problems	ScopeWare
DC Voltage too low/high	ScopeWare
Coupler (power) failure	ScopeWare

1.6 System requirements

In order to use ProfiTrace 2 and all sub programs, your computer system should include the hardware and software listed below:

Minimum requirements:

- ☐ Microsoft Windows XP or Vista
- ☐ 600 MHz Intel Pentium III processor or equivalent
- ☐ 256 MB of RAM
- ☐ 50 MB of available disk space
- ☐ 1024 x 768 resolution display
- ☐ 1 free USB 2.0 high-speed interface port supplying 400 mA
- ☐ 1 Mouse or other pointing device

Recommended (differences to minimum):

- ☐ 1 GHz Intel Pentium III processor or equivalent
- ☐ 512 MB of RAM
- ☐ 1280 x 1024 resolution display or better

Attention Users of Windows 98, 98 Second Edition and Millennium (Me)

PROCEN TEC is not able to offer software downloads or replacement CDs for Windows 98, 98 Second Edition (SE) or Windows Millennium (Me) for ProfiTrace 2. Microsoft has stopped supporting these operating systems, and this change involves all suppliers.

If you received a software CD that lists any of these operating systems on the CD label, be sure to keep it in a safe place since it will no longer be available from PROCEN TEC.

NOTE: The information in this document version supersedes any information in the digital or printed documentation. Although the software for Windows 98, 98 Second Edition, and Windows Me will no longer be available, it could be that ProfiTrace 2 works with these operating systems.

1.7 ProfiTrace structure

All processes of ProfiTrace run parallel. The user can easily switch to a process and inspect the information.

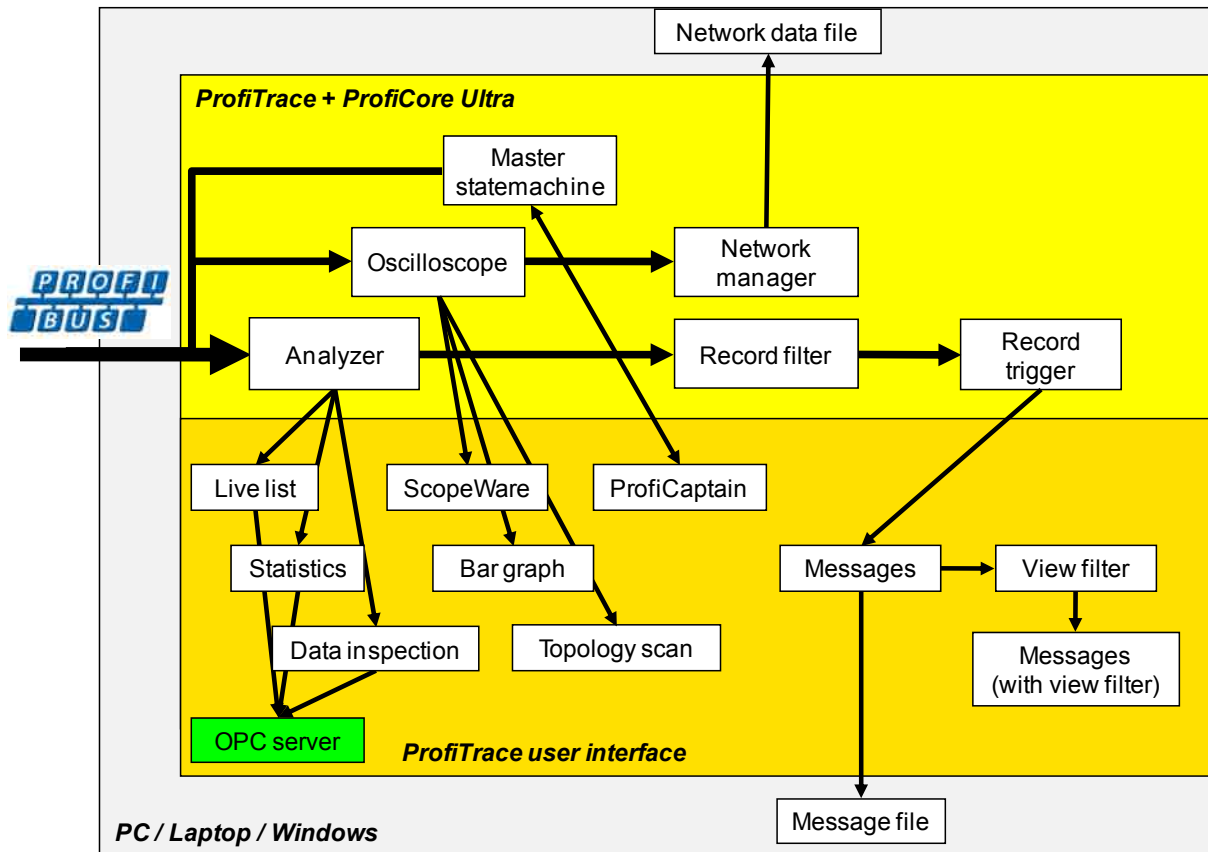


Fig. 1 ProfiTrace processes

2 ProfiCore Ultra

The ProfiCore Ultra is the required hardware to use ProfiTrace 2. It has a robust industrial housing and translates PROFIBUS to USB and vice versa. Because of the USB interface, ProfiTrace 2 can be used on field laptops as well as desktop PCs.

The USB interface also eliminates spur lines. ProfiTrace 2 can be connected almost directly to the bus line and the laptop positioned on a distance. This is a perfect measurement solution for high-speed networks.

- When ProfiTrace 2 is in the analyzer mode, it passively records the data traffic. It does NOT behave as a master or slave.
- When ProfiCaptain is activated, the ProfiCore Ultra acts as a master and transmits messages on the bus.

2.1 Internal structure

ProfiCore Ultra has an isolated RS 485 interface (DB9 connector) and is equipped with a high-speed digital oscilloscope that is able to capture bus signals running at 12 Mbps (see **Fig. 2**). It can also be used on PROFIBUS PA installations with the PA Probe Ultra.

The RS 485 driver is 1/5th of a standard PROFIBUS busload. The chance of disturbing a working installation is therefore reduced to a minimum.

ProfiCore Ultra has the capability to cache data in its on-board memory in case of windows performance problems or 'higher' priority tasks like the hard-disk. ProfiCore Ultra will NOT lose a single message.

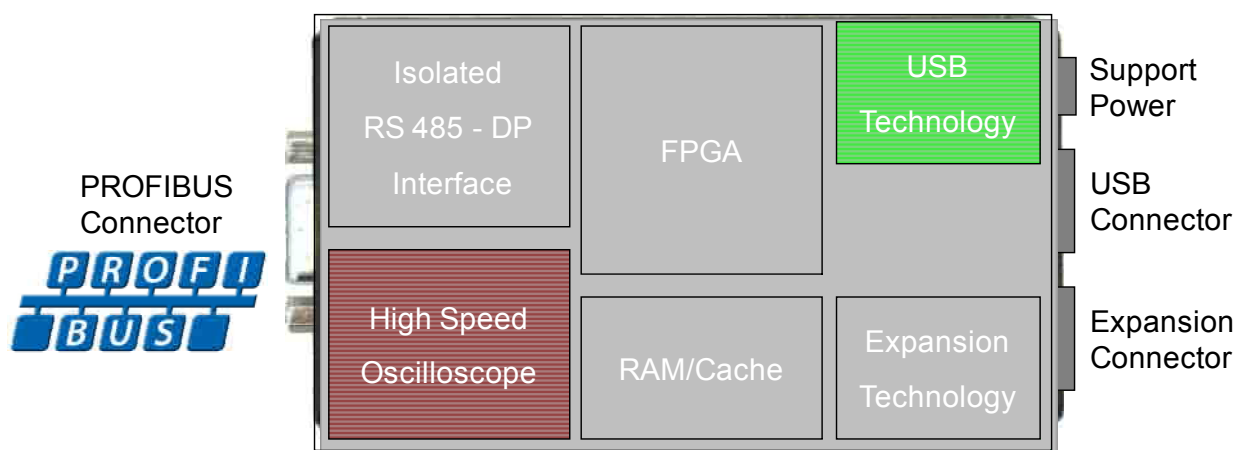


Fig. 2 - Internal structure of the ProfiCore Ultra

2.2 Support-power connectors

In normal cases ProfiCore Ultra does **NOT REQUIRE AN ADDITIONAL POWER SUPPLY** because of the USB connection.

If your laptop/PC is for some reason not able to supply the power to the ProfiCore, there are 2 options;

2.2.1 Micro-USB connection

This requires an additional USB port of your laptop/PC. The Micro-USB cable is provided with the Troubleshooting Toolkit.

2.2.2 Adapter

The adapter has to supply 9 V - 500 mA with a power plug according to: NES/J 21, NES/J 21 W, NES/J 210 XNES/J 210. The adapter is NOT supplied with the product.

2.3 Expansion connector

ProfiCore Ultra has an expansion connector (RJ 45) which can be used for all kinds of additional functionality. ProfiTrace 2 uses the expansion connector to trigger an additional external oscilloscope.

3 Software installation instructions (Windows XP)

This chapter describes the installation for ProfiTrace 2 and the ProfiCore Ultra drivers. It is assumed that you have a basic knowledge of Windows operating systems. All example and dialogs are based on a US/UK based windows installation and may differ slightly based on upgrades, updates and enhancements. Please use the screenshots in conjunction with the description in order to press the appropriate buttons and other user interface items.

It is possible to install ProfiTrace 2 next to ProfiTrace 1, they are both using another default installation directory and the drivers are different. You can even run both applications at the same time.

3.1 Installation procedure

The installation of ProfiTrace has to be done with the following procedure:

- ☐ Preparations prior to installation.
- ☐ Installing the ProfiCore Ultra driver.
- ☐ Installing ProfiTrace.
- ☐ Connecting the ProfiCore Ultra to the USB port.
- ☐ Installing GSD files in ProfiTrace and ProfiCaptain.
- ☐ Setting colour preferences.

3.2 Prior to installation

Prior to installation, follow the steps below:

- ☐ Make sure you always use the latest version of ProfiTrace and ProfiCore Ultra drivers. Updates can be downloaded from: www.procentec.com.
- ☐ Install the latest service packs and 'hot fixes' for Windows.
- ☐ Boot the PC in the normal mode of Windows (NOT in the safe mode).
- ☐ Under multi-user versions/installations of Windows make sure you have administrator rights.



Do NOT connect the ProfiCore Ultra to the USB port (yet)!

3.3 Setup program

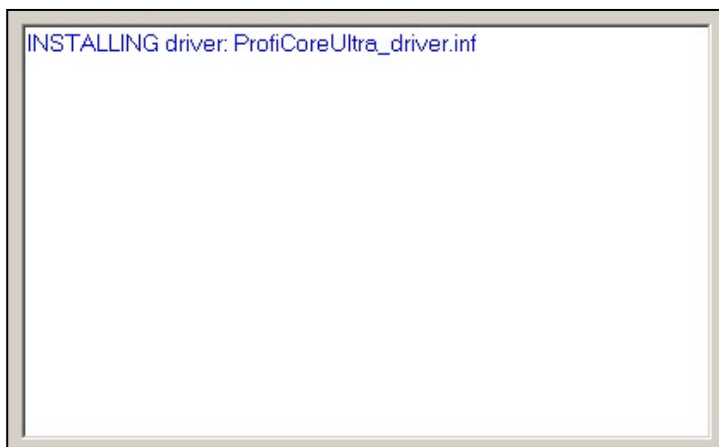
Insert the ProfiTrace CD in the CD-ROM drive and/or start the **Setup.exe**. The install shield will display an introduction screen (see next screenshot).



Click **“Install”** to install ProfiTrace and the ProfiCore Ultra driver. If you only want to install one of them, just unselect the option you want to skip.

3.4 ProfiCore Ultra driver installation

The install shield will first install the ProfiCore Ultra driver. In a window the results of the installation can be followed. Blue letters are OK, red letters indicate a problem. The driver can also be installed manually by starting **“DriverInstall.exe”**.



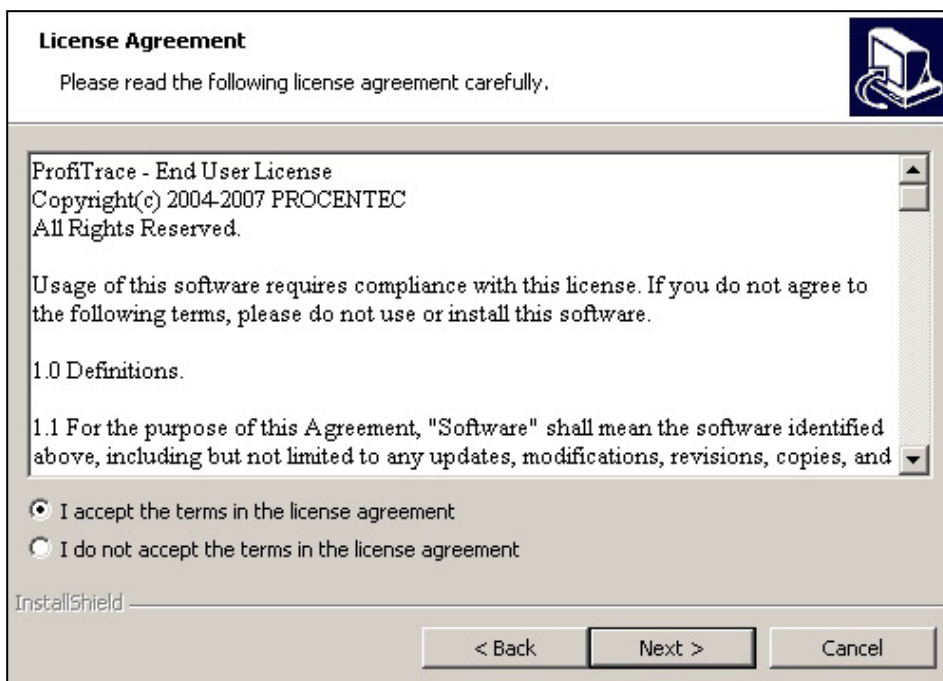
3.5 ProfiTrace installation

After the ProfiCore Ultra driver has been installed the setup procedure continues with the installation of ProfiTrace.



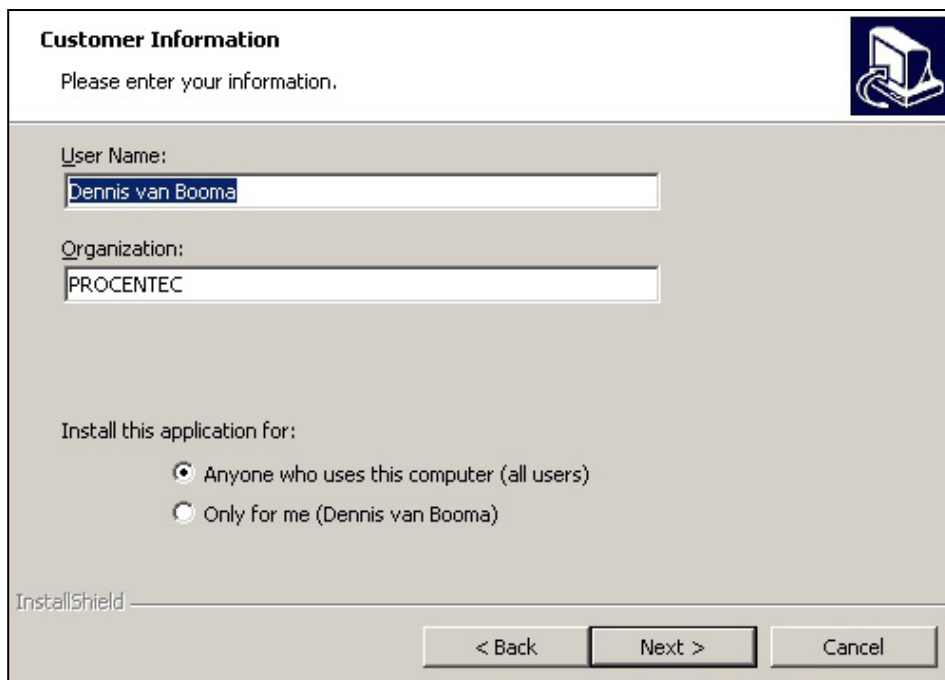
Click **"Next"** to proceed.

You have to accept the terms of the license agreement.



Click **"Next"** to proceed.

Fill in your name and organization.



Customer Information

Please enter your information.

User Name:

Organization:

Install this application for:

☒ Anyone who uses this computer (all users)

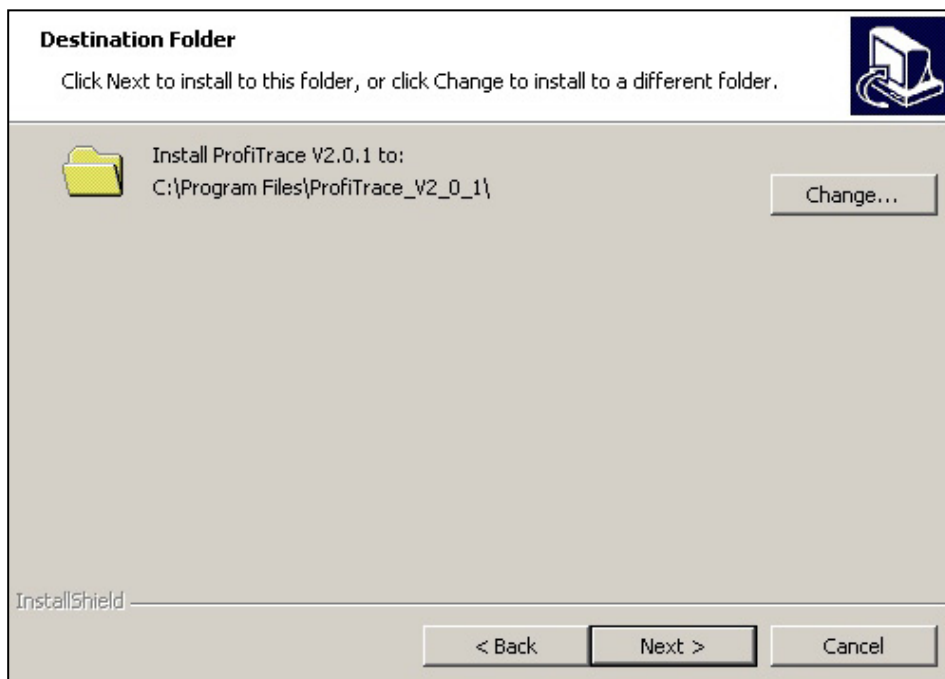
☐ Only for me (Dennis van Booma)

InstallShield

< Back Next > Cancel

Click **"Next"** to proceed.

Select your destination folder.



Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install ProfiTrace V2.0.1 to:

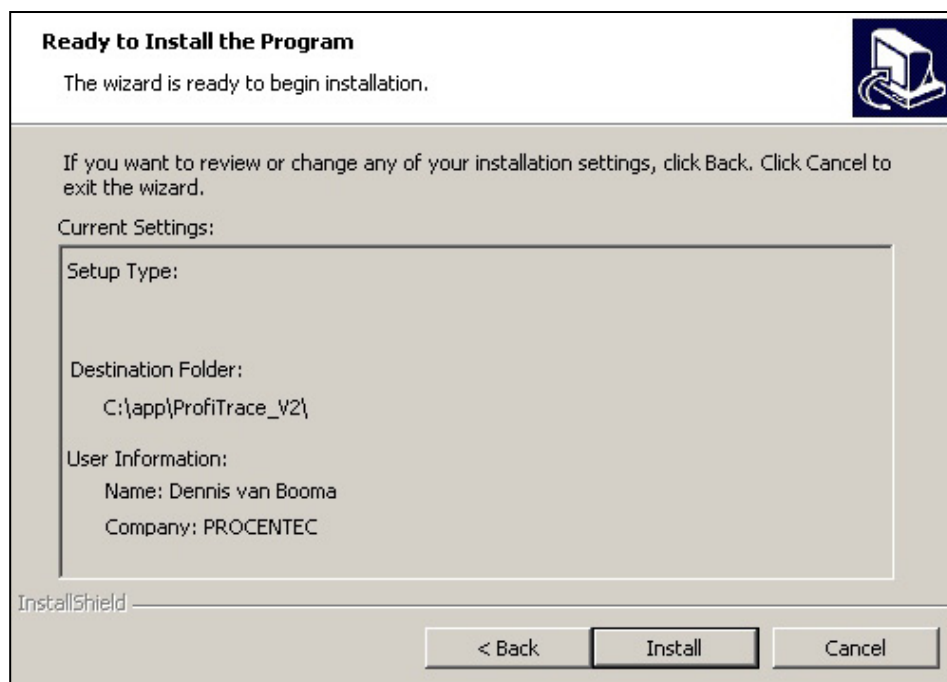
Change...

InstallShield

< Back Next > Cancel

Click **"Next"** to proceed.

Check your settings.



Click **"Install"** to start the installation process.

After the installation process, ProfiTrace is ready for use, however we recommend rebooting the PC.



Click **"Finish"** to close the install shield.

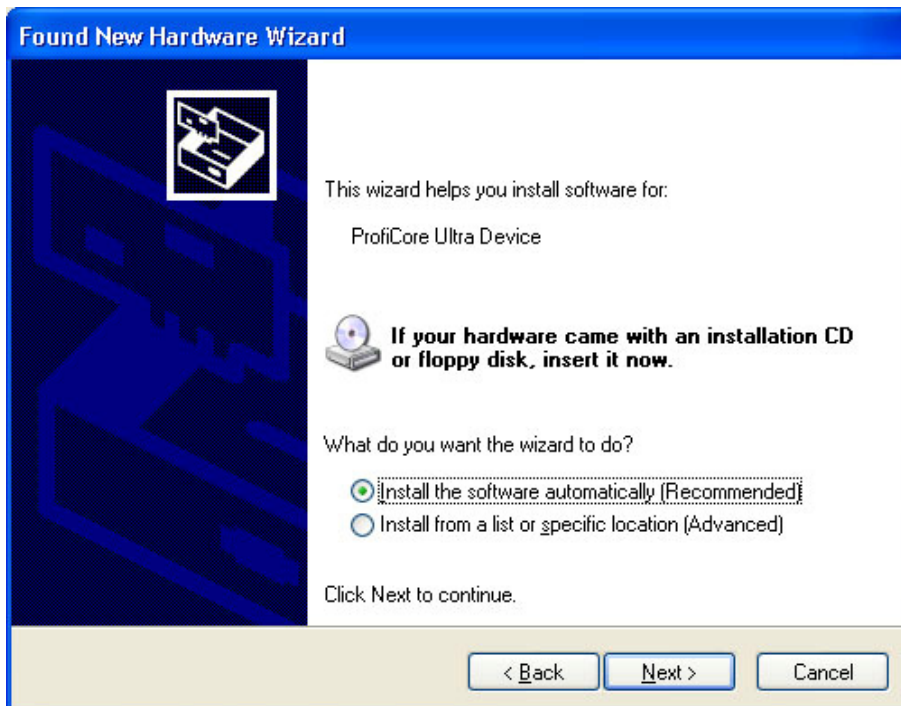
3.6 Connecting ProfiCore Ultra to the USB port

After connecting the ProfiCore Ultra to the USB port, the last installation process will start.



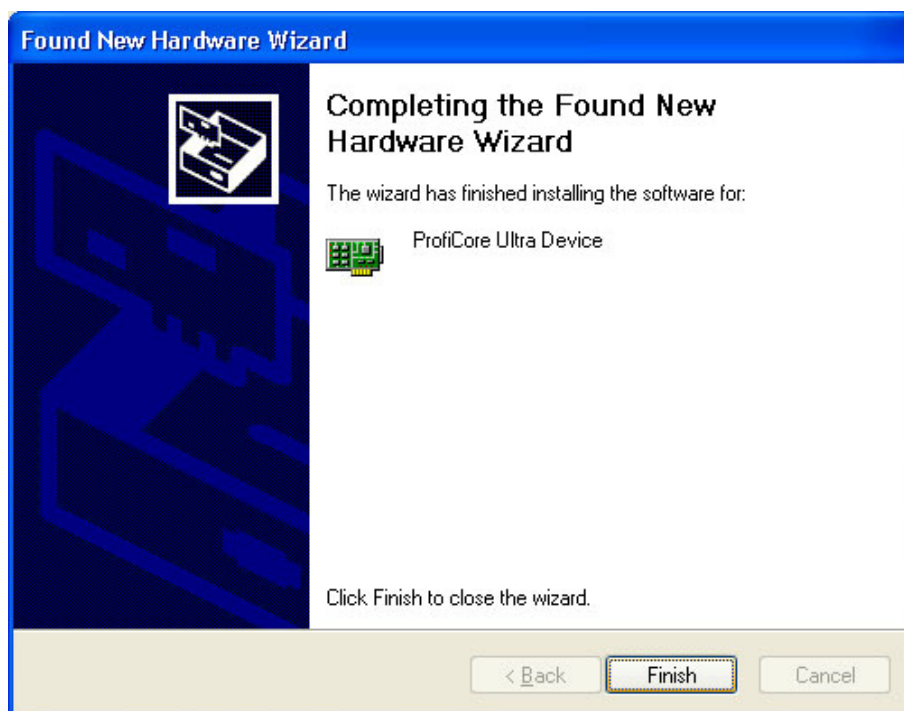
Click **"Next"** to proceed.

Select the location of the drivers. Normally the first option is sufficient.



Click **"Next"** to proceed.

The driver is ready for use; however we recommend rebooting the PC.



Click **“Finish”** to close the install shield.

When the ProfiCore Ultra is connected to another USB port, the driver installation process will start again (only once for every port or ProfiCore Ultra).

3.7 Directories

After installation ProfiTrace has created the following directory structure:

Directory	Purpose	Requires backup
\App	Program, setting, language and license files.	
\Dat_files	Saved projects.	Yes
\Exports	Exported data.	Yes
\Filter_settings	Settings for data filtering.	Yes
\Gsd	GSD files for ProfiTrace and ProfiCaptain.	Yes

\Gsdlibtmp	Catalogue of scanned GSD files.	
\Inspect_files	Settings of the data inspector in ProfiTrace.	Yes
\Network_data	Saved information from the network manager.	Yes
\Proficore_ultra_usb_driver	USB drivers for the ProfiCore Ultra.	
\Search_settings	Message search settings.	Yes

Fig. 3 illustrates the ProfiTrace directory structure

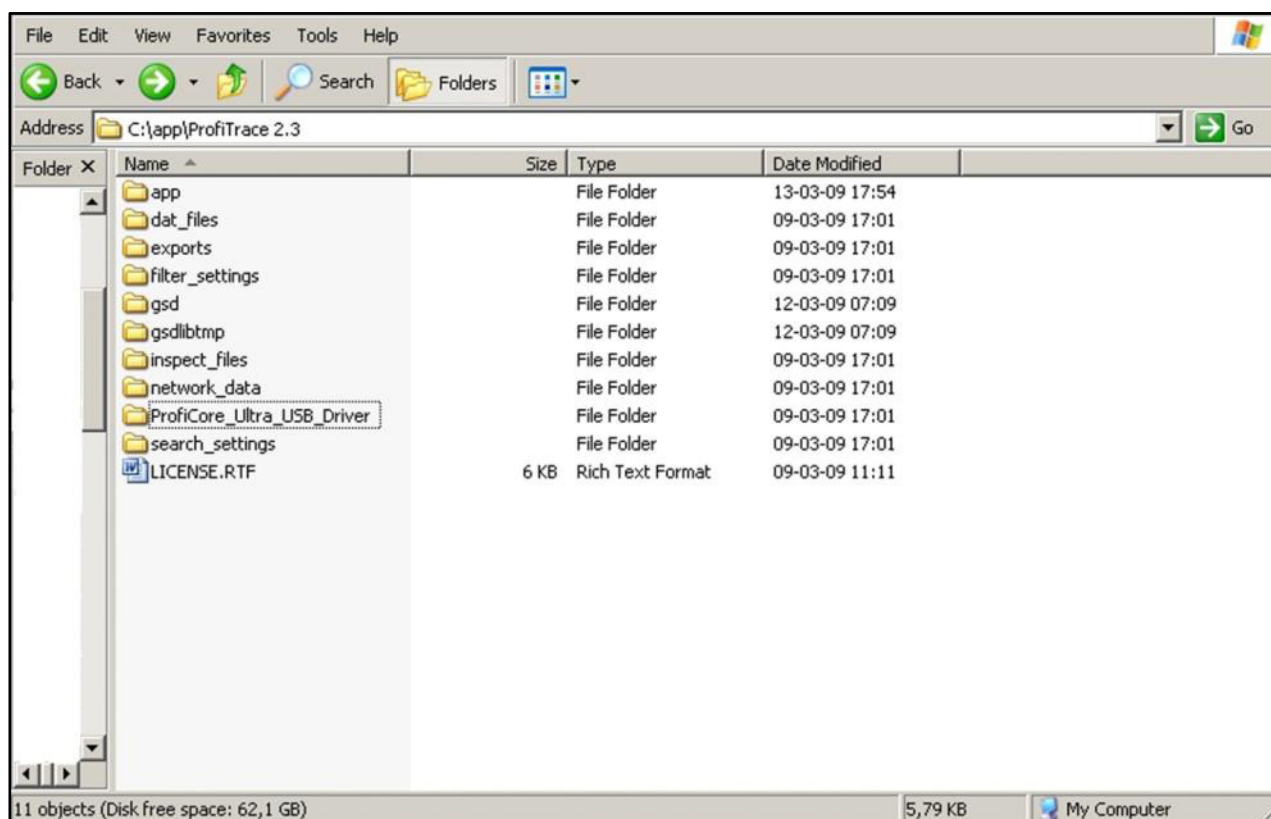
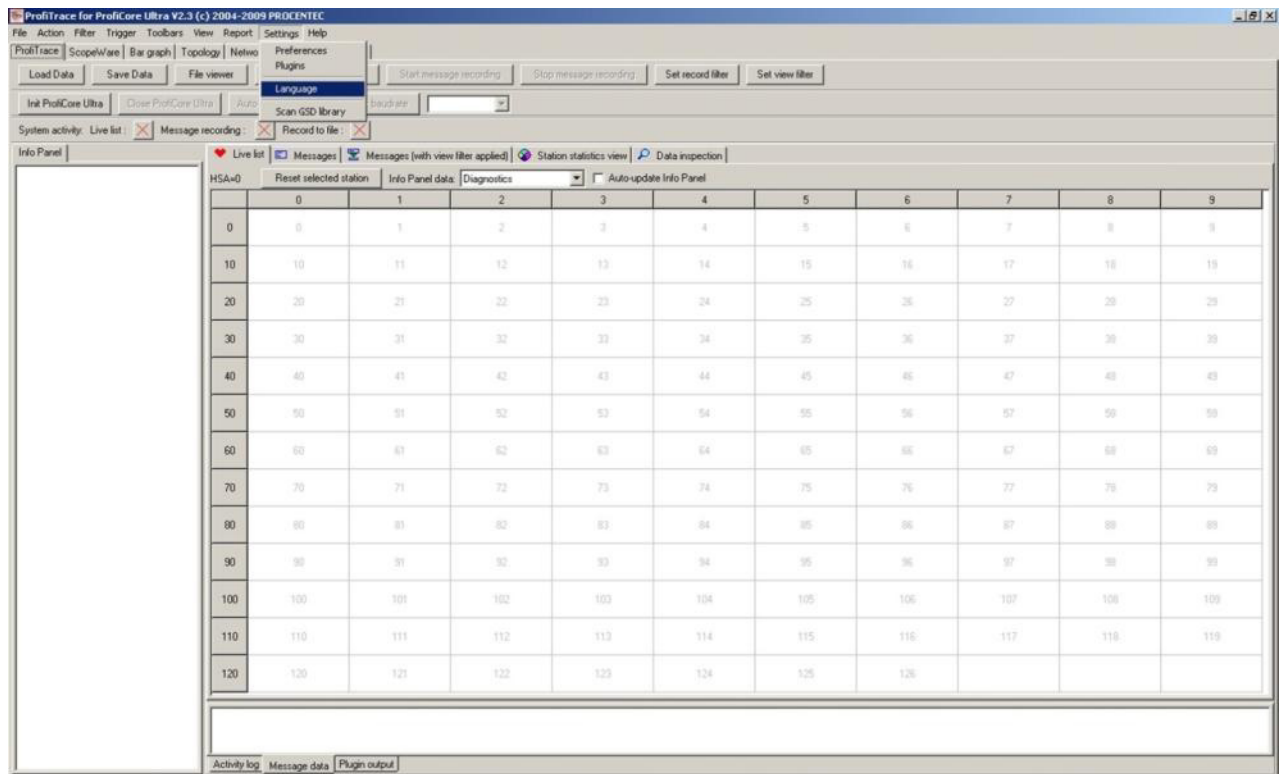


Fig. 3 ProfiTrace directory structure

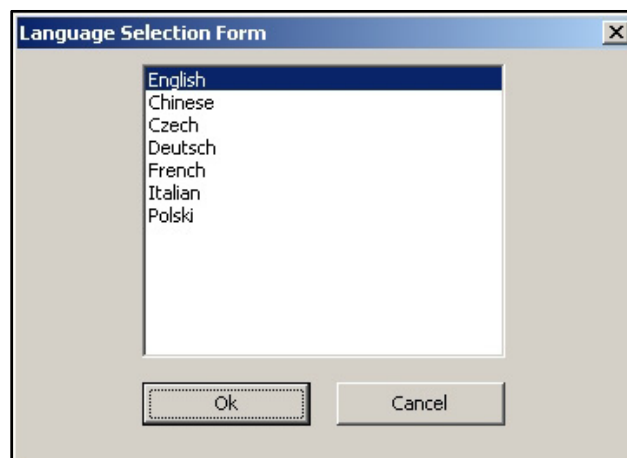
3.8 Selecting the language of the user interface

ProfiTrace V2.3 and later supports a range of interface languages. Language files stored in the \APP directory and have the extension .PLN.

ProfiTrace already provides a basic set of languages, but additional language files can be downloaded from the PROCENDEC website and copied in the \APP directory.



Click **“Settings”** followed by **“Language”** to obtain a list of included languages.



ProfiTrace will display a list of detected languages files which are located in the \APP directory.

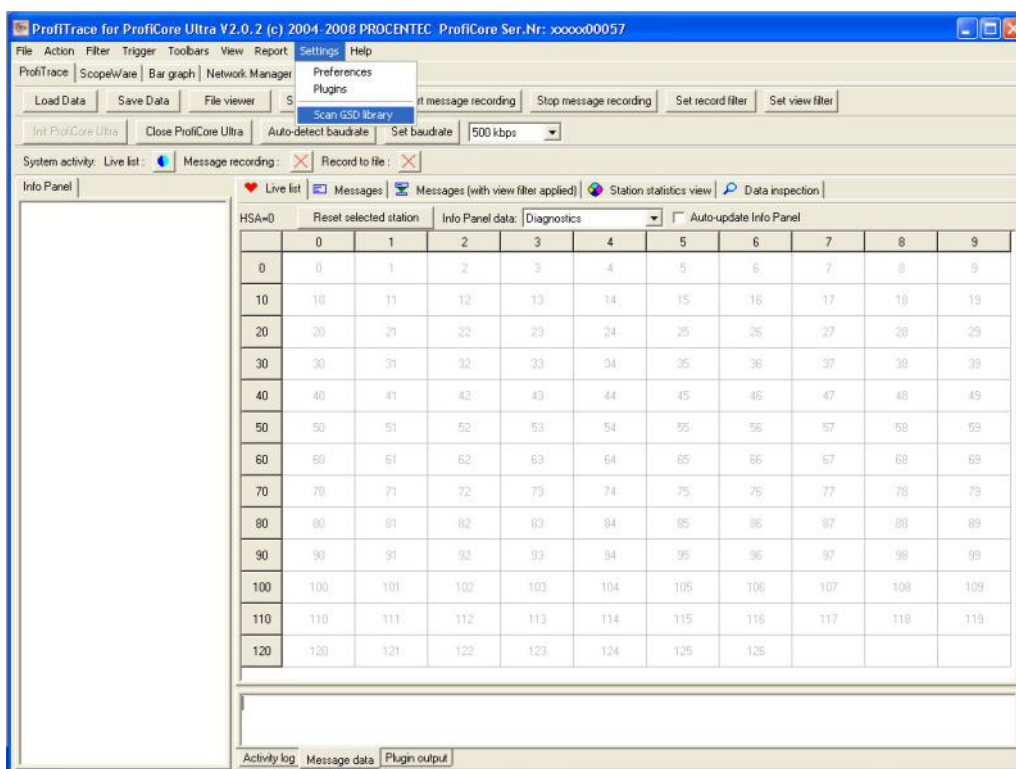
Click on the preferred language that is included in the current installed version followed by **“OK”**.

After the selection, ProfiTrace will exit and you have to restart it. After the restart the user interface has switched to the preferred language.

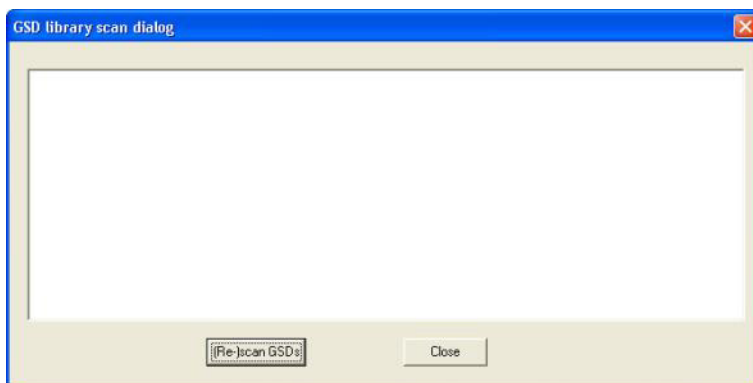
3.9 Installing GSD files in ProfiTrace

ProfiTrace has the capability to display the Model_Name of the device in the Live List. The Model_Name comes from the GSD file of the device. If you want to use this feature, you have to copy all the required GSD files to the “\GSD” directory. You can also point to a GSD directory of another application (in the setting menu).

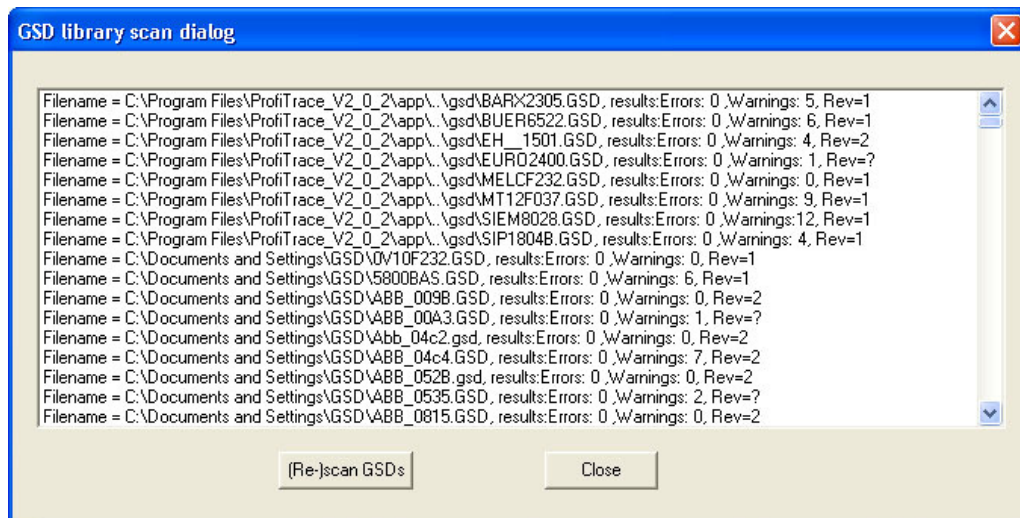
After the copy process, ProfiTrace has to scan the GSD files in order to create an internal catalogue. You only have to do this once! Unless you remove, add or edit a GSD file.



Click “**Settings**” followed by “**Scan GSD Library**” to proceed.



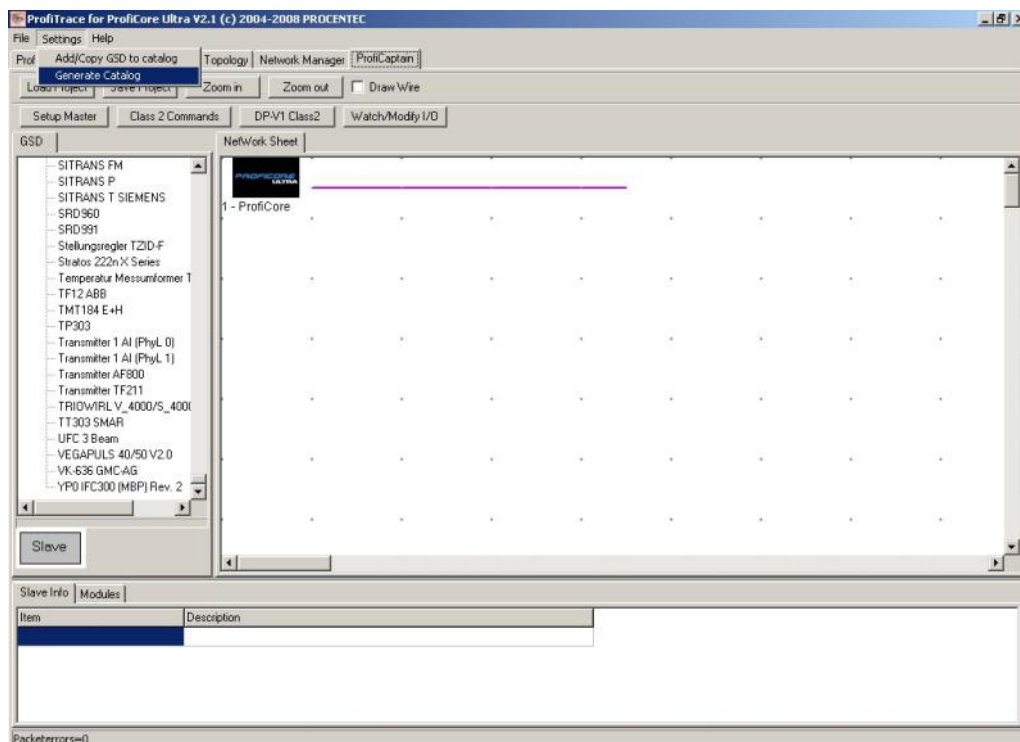
Click “**(Re)Scan GSDs**” to proceed.



Click **“Close”** to finish the GSD scanning.

3.10 Installing GSD files in ProfiCaptain

The catalog update of the GSD files in ProfiCaptain is NOT automatically linked with ProfiTrace. The scanning of GSD files has to be repeated in ProfiCaptain.

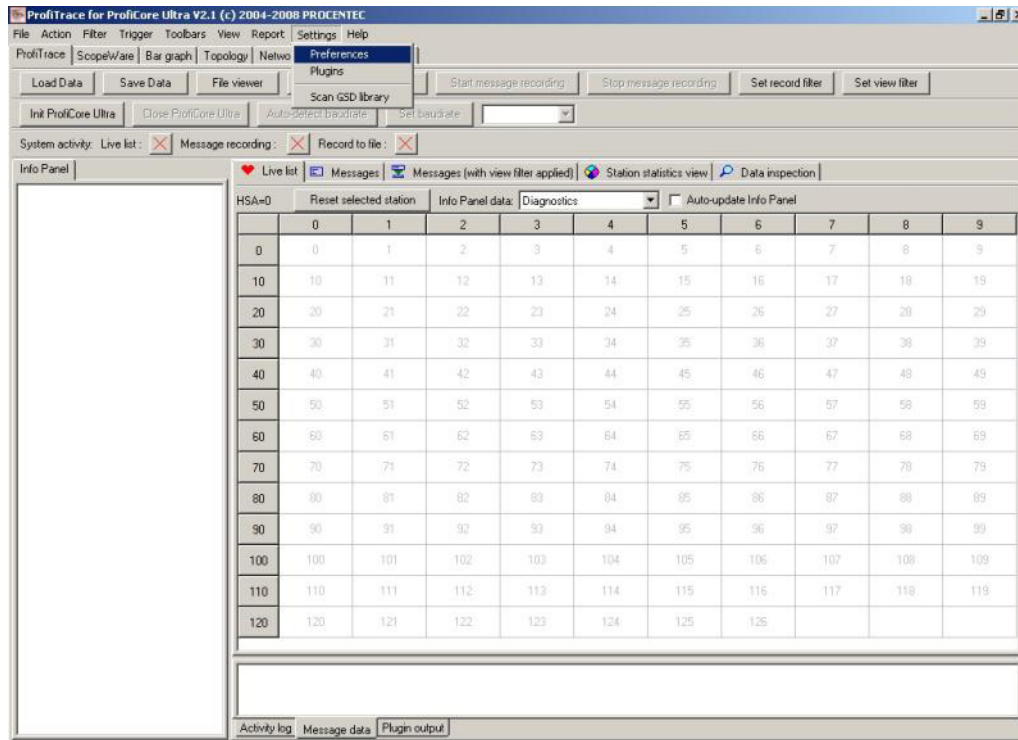


Click **“Settings”** followed by **“Generate Catalog”** to scan the GSD files.

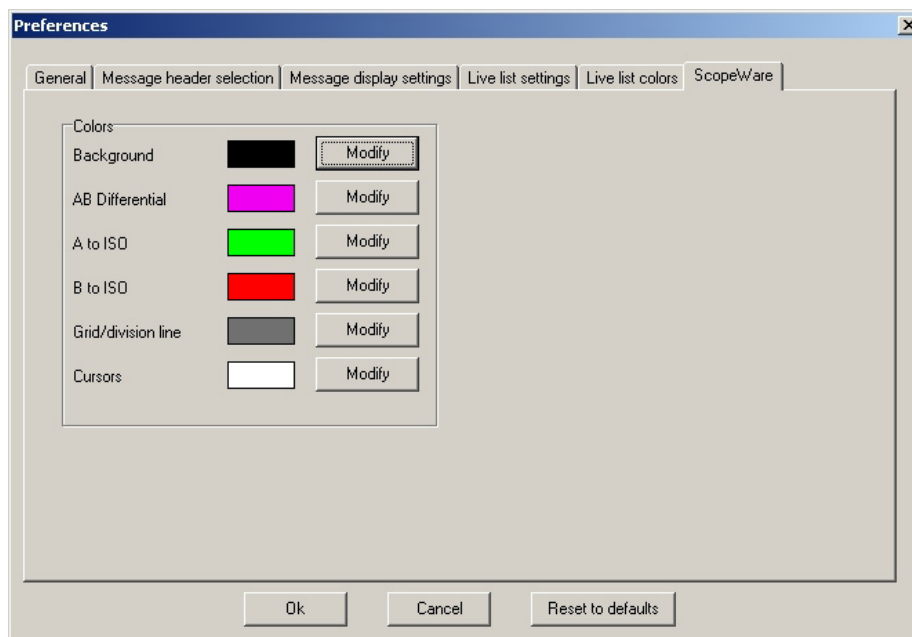
To remove a GSD file from the catalog you need to manually delete the file from the GSD directory and generate the catalog again (*Settings->Generate Catalog*).

3.11 Setting colour preferences

The colours of the ScopeWare (signals and background) can easily be adjusted in the Settings/Preferences menu.



Click **“Settings”** followed by **“Preferences”** to proceed.



Click on **“ScopeWare”** to set the oscilloscope colours.
For presentations it is recommended to set the AB Differential colour to Yellow. If you want to adjust the Live List colours, click on **“Live List colours”**.

3.12 Upgrades

It is the policy of PROCEN TEC to release periodic upgrades. These upgrades do NOT overwrite the previous version! If you do not want to use the previous version anymore, you can follow this procedure:

- ☐ Uninstall the previous version by means of the Control panel in Windows.
- ☐ Rename or move the directory of the previous version to a more suitable name / location.
- ☐ Install the new version on-top of the directory from the previous version. If you are confronted with a warning about existing drivers which seems to be newer (see **Fig. 4**), just click 'Yes' and overwrite them.
- ☐ Update the shortcut on the desktop.

You have now access to all previous GSD, DAT, plugin and configuration files. After starting ProfiTrace, scan the GSD files again (also in ProfiCaptain).

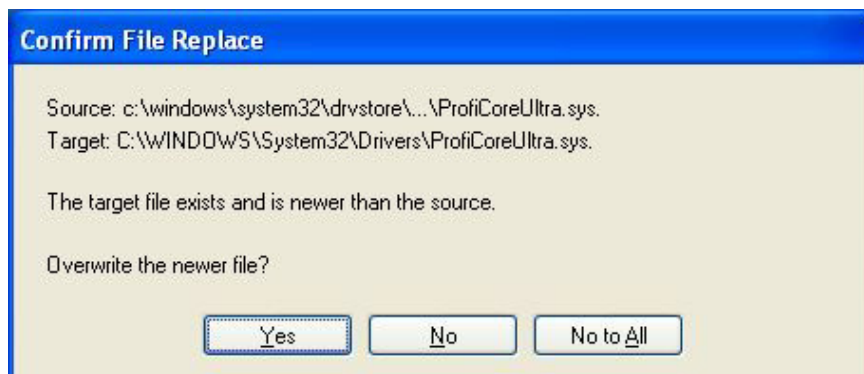


Fig. 4 – Warning prior to replacing drivers (confirm with Yes)

4 License system

4.1 Introduction

For online operations you need a license for the parts you want to use. Offline it can be used without licenses.

You can purchase a license for the following combinations:

- ProfiTrace 2
- ProfiTrace 2 + ScopeWare + Bar graph + Reporting
- ProfiTrace 2 + ScopeWare + Bar graph + Reporting + Topology scan
- *<Every combination>* + ProfiCaptain

The license you have purchased now can later on always be enhanced with extra functionality.

4.2 Characteristics of the license file name

The license is defined by a file with the extension **.PLD**. This file has to be copied automatically or manually to the “**APP**” directory of ProfiTrace 2.

The license file is related to the serial number of the ProfiCore Ultra. On the bottom of the ProfiCore Ultra the serial number can be found. It is a 10-digit number. **Fig. 5** illustrates the serial number of the ProfiCore Ultra.

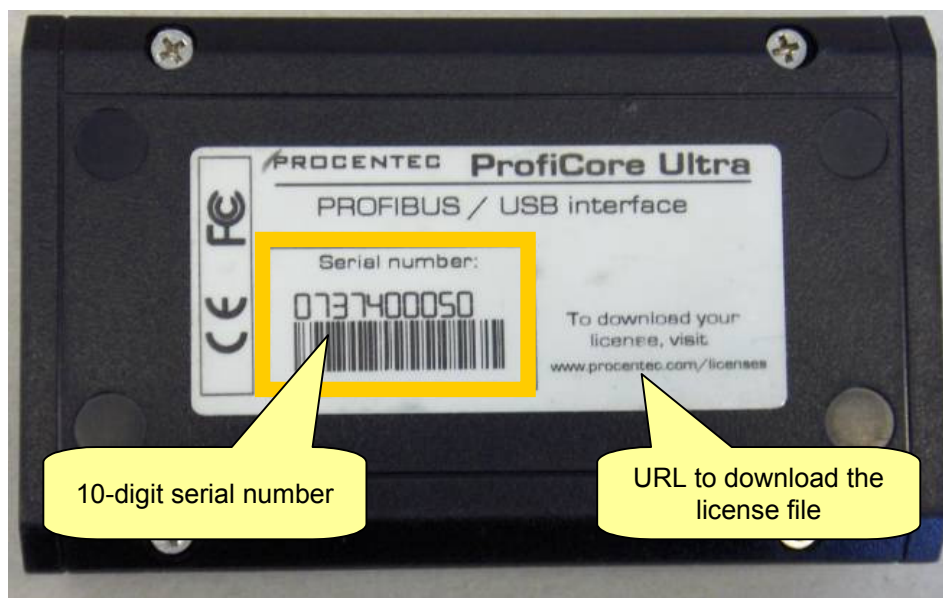
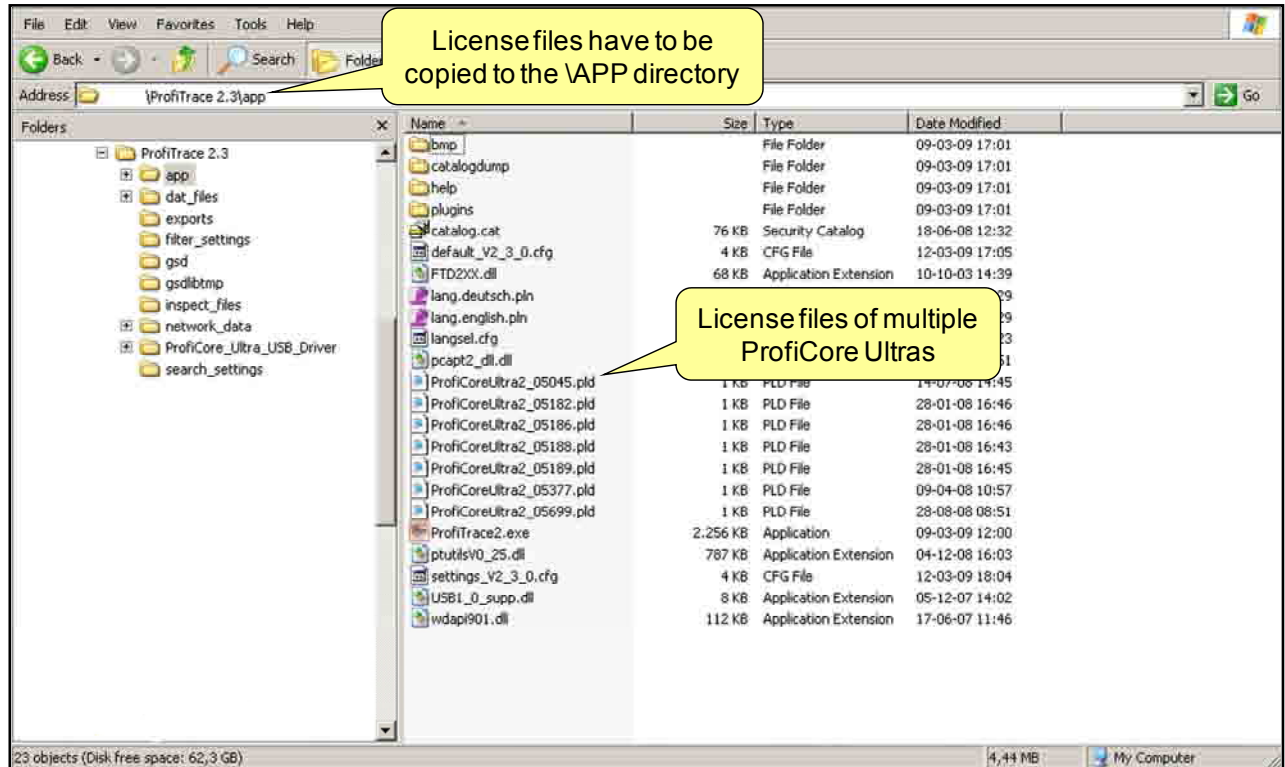


Fig. 5 – ProfiCore serial number

The license file for the ProfiCore Ultra in Fig. 5 is: **ProfiCoreUltra2_00050.PLD**

4.3 Storage location of the license files

It is allowed to store multiple licenses in the “\APP” directory of ProfiTrace.



It is also allowed to store the licenses on multiple PCs. The ProfiCore Ultra you utilize will determine the functionality of ProfiTrace. **Fig. 7** illustrates how licenses can be stored on multiple PCs.

4.4 Obtaining the license files

There are 2 ways to obtain the license files (see **Fig. 6**):

- 1) You can download the license file through our website: **www.procentec.com/licenses**
Fill in your data and serial number of the ProfiCore Ultra (See paragraph 4.2 where to find the serial number).
Automatically a web page will open where you can directly download the license. After download you have to copy it to the “\APP” directory (see paragraph 4.3 for the storage location).
- 2) If your PC has internet connection, you can download the license automatically through ProfiTrace. Connect the ProfiCore Ultra to the USB port and click on Init ProfiCore. ProfiTrace will inform you that it could NOT find valid license files and an option will be offered to download the license automatically.

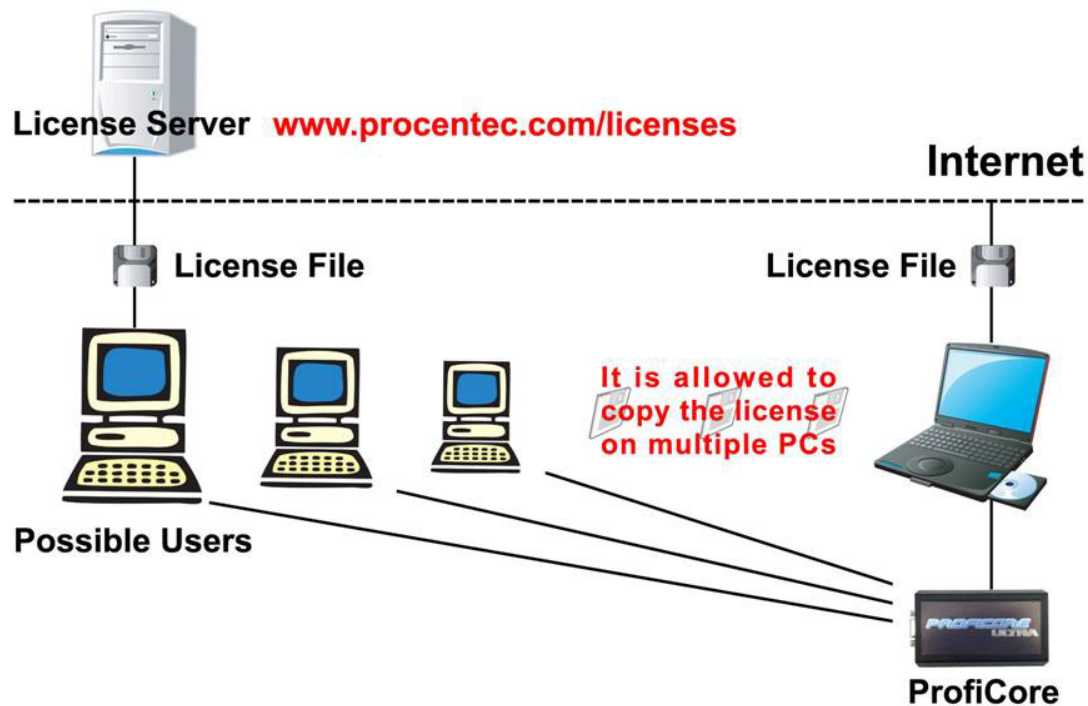


Fig. 7 – License files on multiple PCs

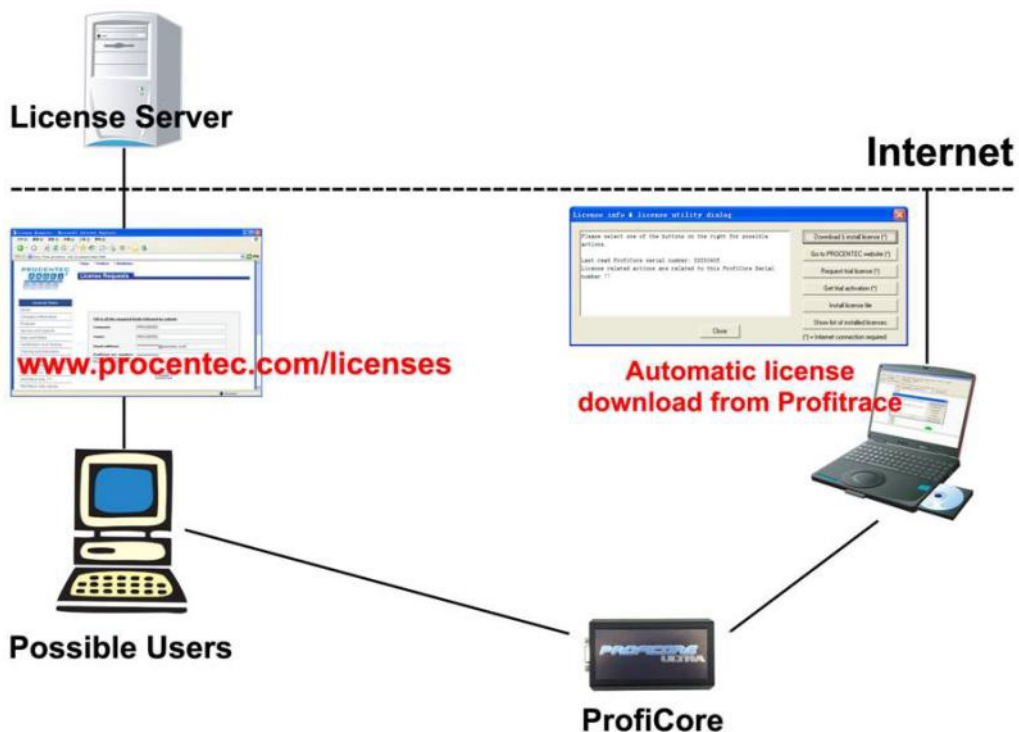


Fig. 6 – Obtaining the license files

5 Quick start

5.1 Attaching ProfiCore Ultra to the installation

Attach the ProfiCore with the USB cable to your laptop/PC. The green LED should be ON if the laptop/PC is powered!

It depends on the installation how we connect the ProfiCore to the installation. On DP – RS 485 installations we use the Tap Connector (see chapter 15), On PA – MBP installations we use the PA Probe.

5.1.1 Attach the Tap Connector to the ProfiCore (DP).

Attach the straight plug of the Tap Connector to the DB9 connector of the ProfiCore (see Fig. 8).

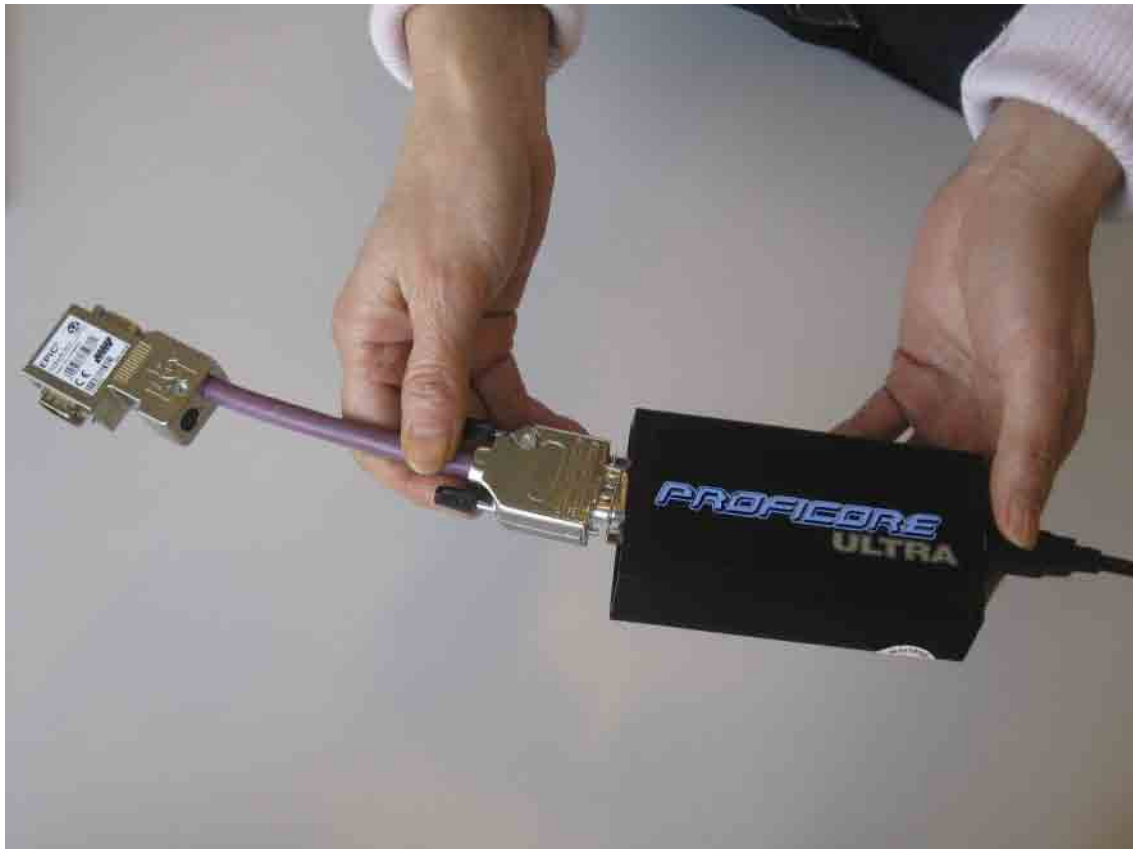


Fig. 8 - Attaching the Tap Connector to the ProfiCore



Please check if the termination resistor on the Tap Connector is OFF! In regular situations the termination on the Tap Connector is NOT required.

5.1.2 Attaching the ProfiCore to the DP installation

Attach the 90 degrees plug of the Tap Connector on top of a piggy back connector of the PROFIBUS DP installation (see **Fig. 9**).



Fig. 9 - Attaching the ProfiCore to a DP installation



Tighten the screws to avoid the Tap Connector from accidently detaching of the piggy back plug.

5.1.3 Attaching the PA Probe to the ProfiCore

Attach the DB9 connector of the PA Probe to the DB9 connector of the ProfiCore (see **Fig. 10**). It is recommended to prepare some wires and if possible a suitable plug, which will serve as the link between the PA coupler and PA Probe.

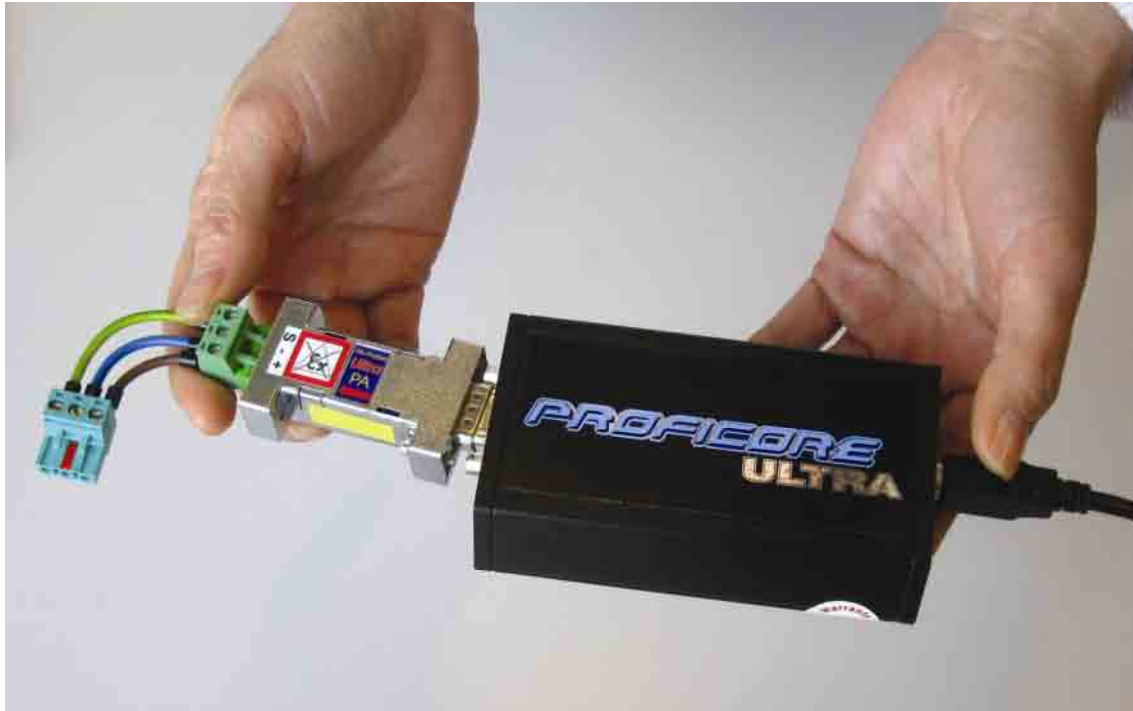


Fig. 10 - Attaching the PA Probe to the ProfiCore



The ground lead (S) has to be used as well and it is essential that the adapter of a laptop is grounded (this is not valid for battery powered laptops).

5.1.4 Attaching the PA Probe to the PA installation

Screw/bind the connected leads of the PA Probe to the PA installation (see **Fig. 11**). The recommend location is the PA coupler. The PA Probe has NO imposed polarity for the PA signals, but the shield/ground (S) has to be connected with the coupler to obtain a high quality measurement.



Fig. 11 - Attaching the PA Probe to the installation



The PA Probe is NOT Ex certified and only suitable for safe zones. It can logically operate in an Ex environment, but safe behaviour is NOT guaranteed.

5.2 Starting ProfiTrace 2

After starting up the ProfiTrace software, the screen as in **Fig. 12** should appear. Click on “Init ProfiCore Ultra” to start the software.

When you have a “PA Probe” attached to the ProfiCore Ultra it will be automatically detected!

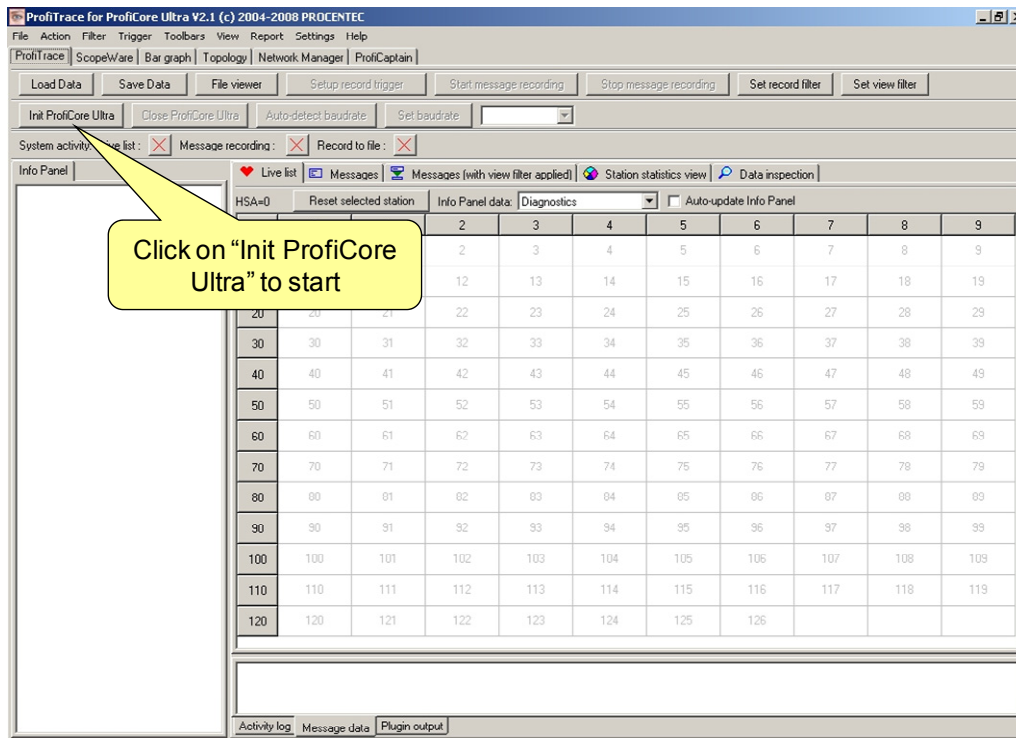


Fig. 12 - ProfiTrace start-up screen

After clicking on “Init ProfiCore Ultra”, The ProfiTrace software:

- 1) Detects if ProfiCore Ultra is connected to the USB port.
- 2) Checks if the required license has been installed.
- 3) Scans the baudrate of the network.

After the baudrate has been detected, the Live List and the detected baudrate as in **Fig. 13** should be visible.

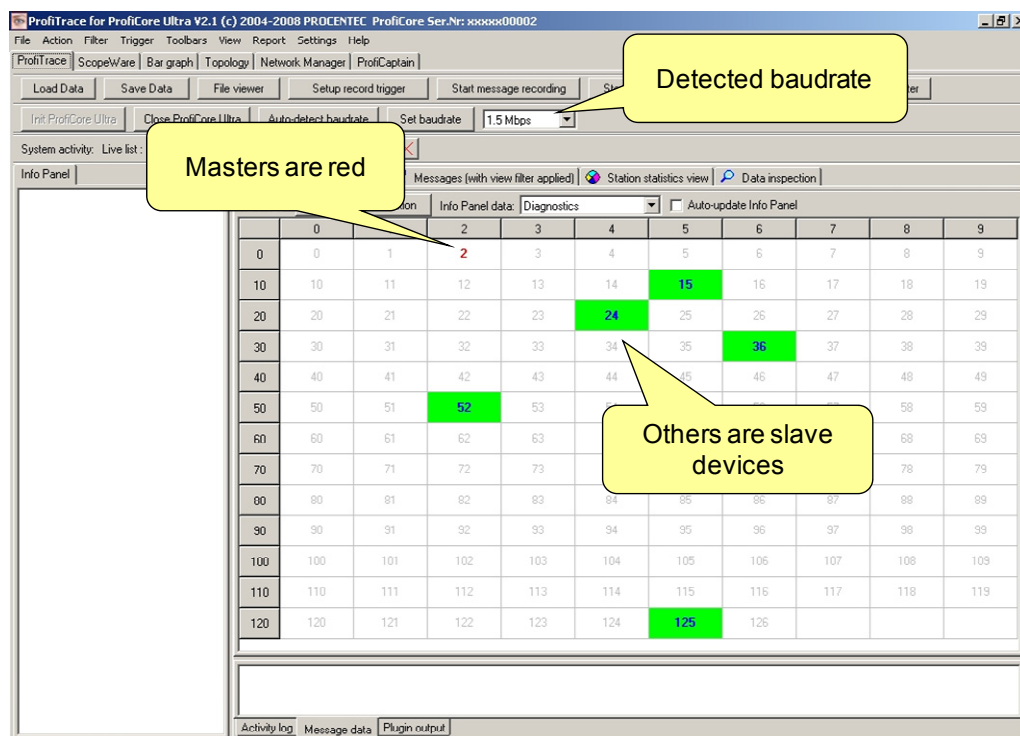


Fig. 13 – Live List after initialization

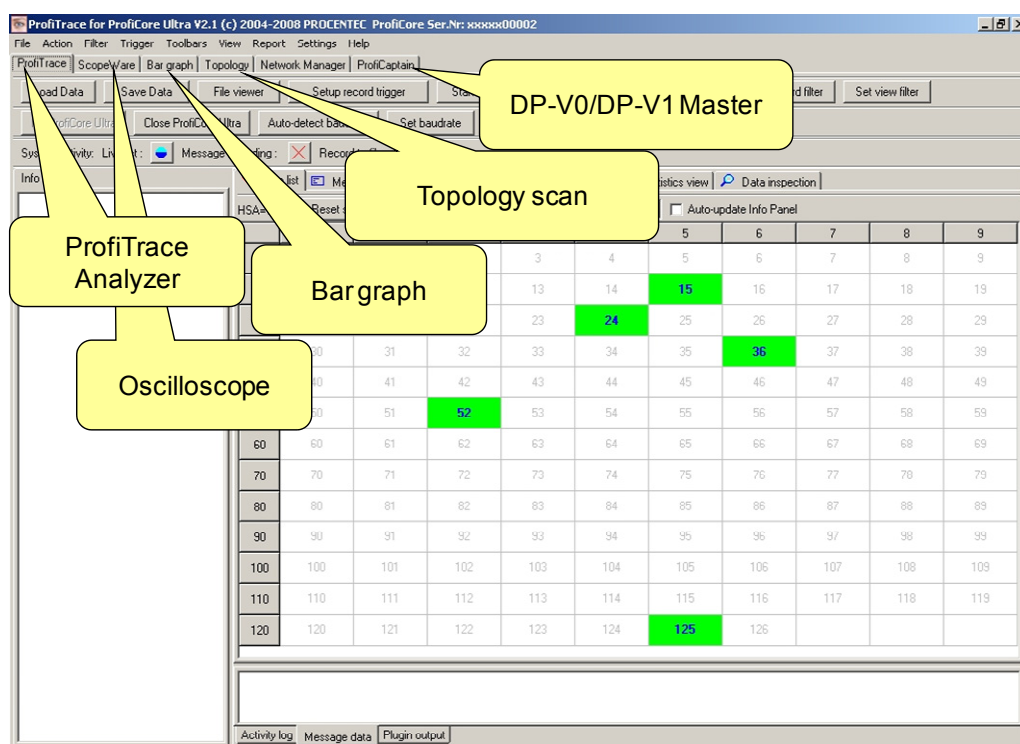


Fig. 14 – Navigating in ProfiTrace

From this point the software can be easily navigated to different modes by just clicking on its representing tab (see **Fig. 14**):

- ProfiTrace *Live List, Statistics, Message Recording and Data Inspection*
- ScopeWare
- Bar graph
- Topology scan
- ProfiCaptain *Class 1 and 2 DP master*

All modes work parallel. Navigating to another mode will NOT erase the information from the previous mode.

5.3 Busmonitor/Analyzer

ProfiTrace itself is an analyzer to display a Live List, record messages, view statistics, inspect data, etc. (see **Fig. 15**).

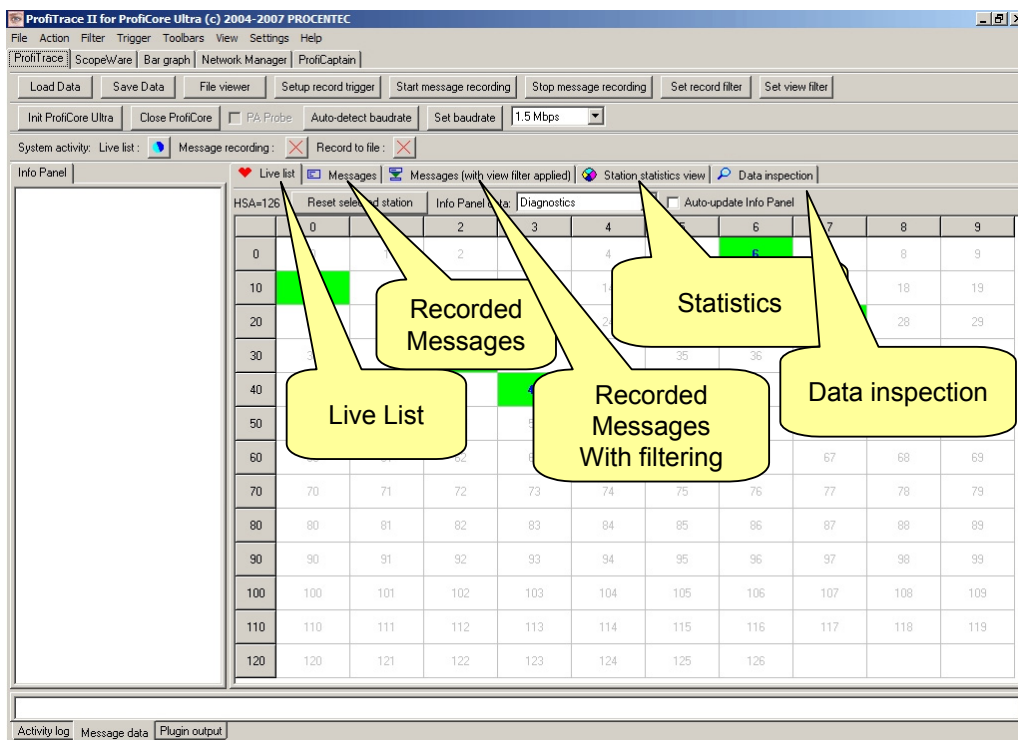


Fig. 15 – ProfiTrace functions

5.3.1 Live List

“Colours make it easy.....”

The Live List is a matrix that continuously lists all the available devices. It is directly visible which devices are ‘troublemakers’. With different background colours the status of the devices is displayed (See Fig. 16):

- Green: Device is in Data Exchange
- Yellow: Device is lost
- Red: Parameter fault
- Purple: Configuration fault
- No colour: On the bus but not in Data Exchange

The Live List can also generate the product name of the devices when a diagnostic message is captured (synchronized with the GSD library).

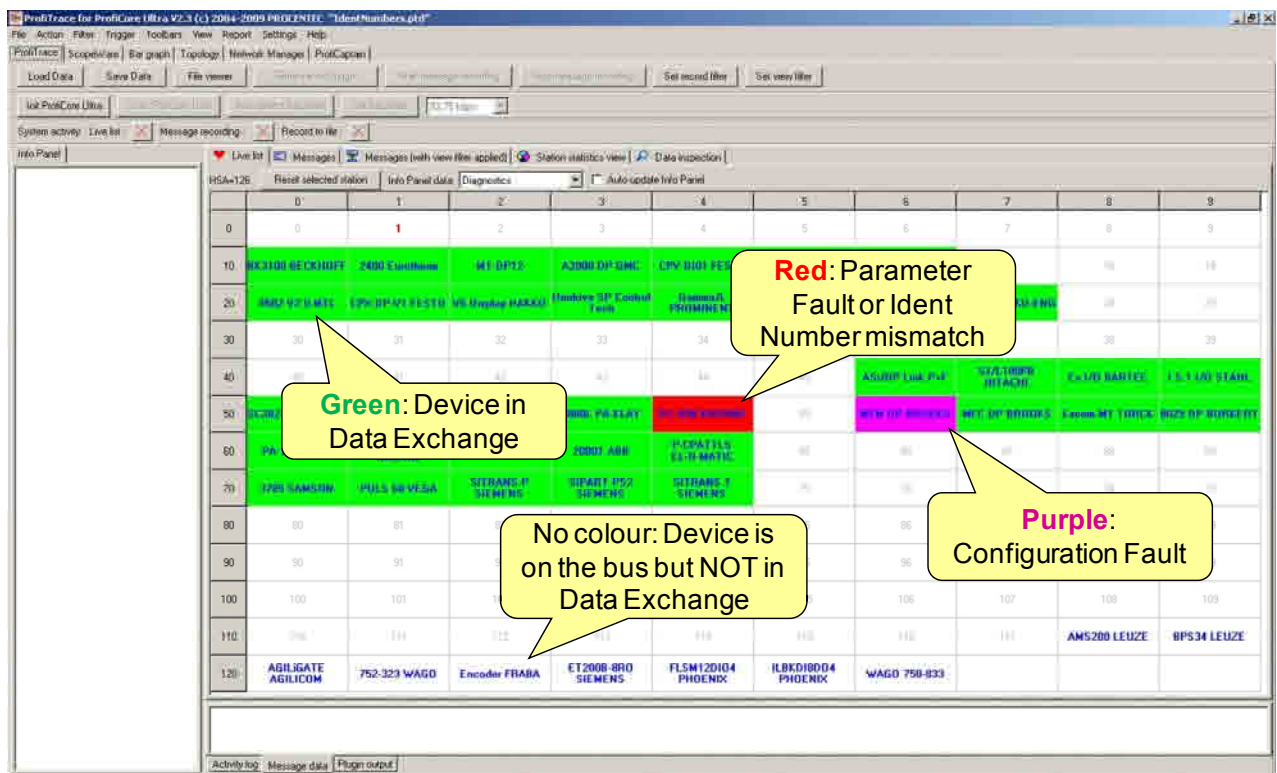


Fig. 16 Live List showing deviations

5.3.2 Statistics

“Click and go.....”

The statistics matrix is the most powerful feature of the analyzer. This field can really indicate what the condition of the installation is. It displays all the important information that a user, especially a maintenance technician is really interested in:

- Retry messages.
- Fall-outs.
- Bus cycle time.
- Diagnostic messages, etc.

Because of this feature, the user does not have to inspect messages or do difficult operations to ensure the quality of the installation.

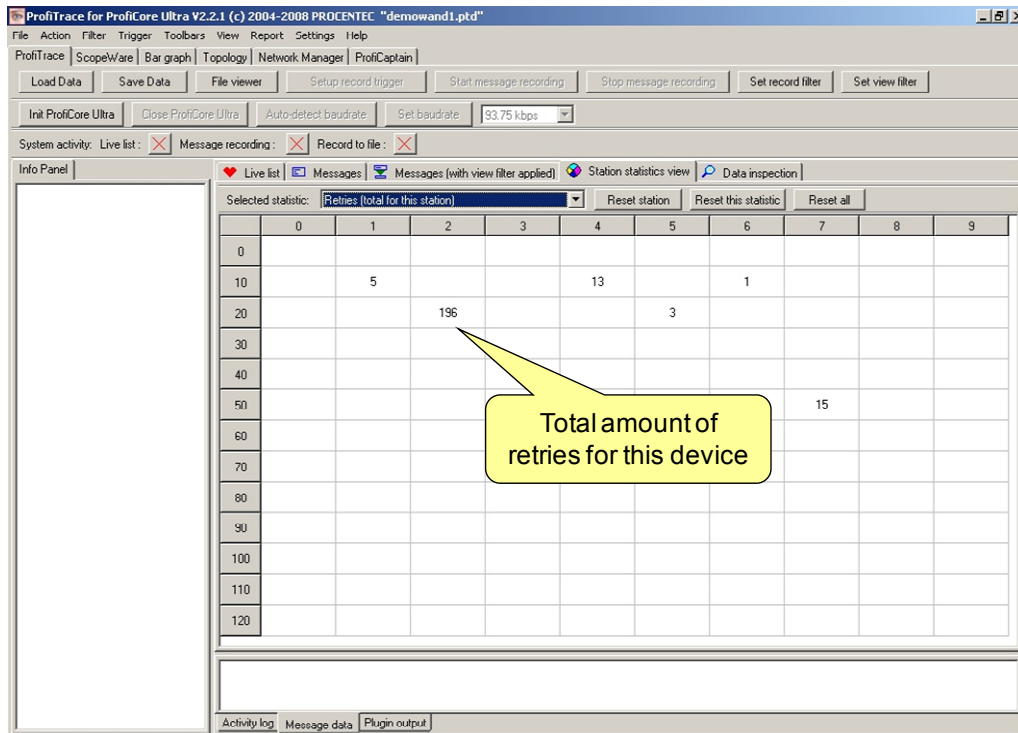


Fig. 17 – Statistics showing the Retries

If the statistics do NOT show deviations, the installation is on the 1st degree OK!!!

Here it stops for the technician who is only interested in a quick feedback. The advanced technician can proceed with a message recording and an inspection of the signal quality.

5.3.3 Message recording

"The absolute truth....."

When the user records messages, he has a perfect visual representation on the screen (see **Fig. 18** and **Fig. 19**).

In the preferences menu the columns and timing units can be set.

After the scanning of the GSD files, it is also possible to inspect process values and see diagnostic information in understandable text in the info panel. All the other basic busmonitor features like: logging, file management, search functions, etc are supported.

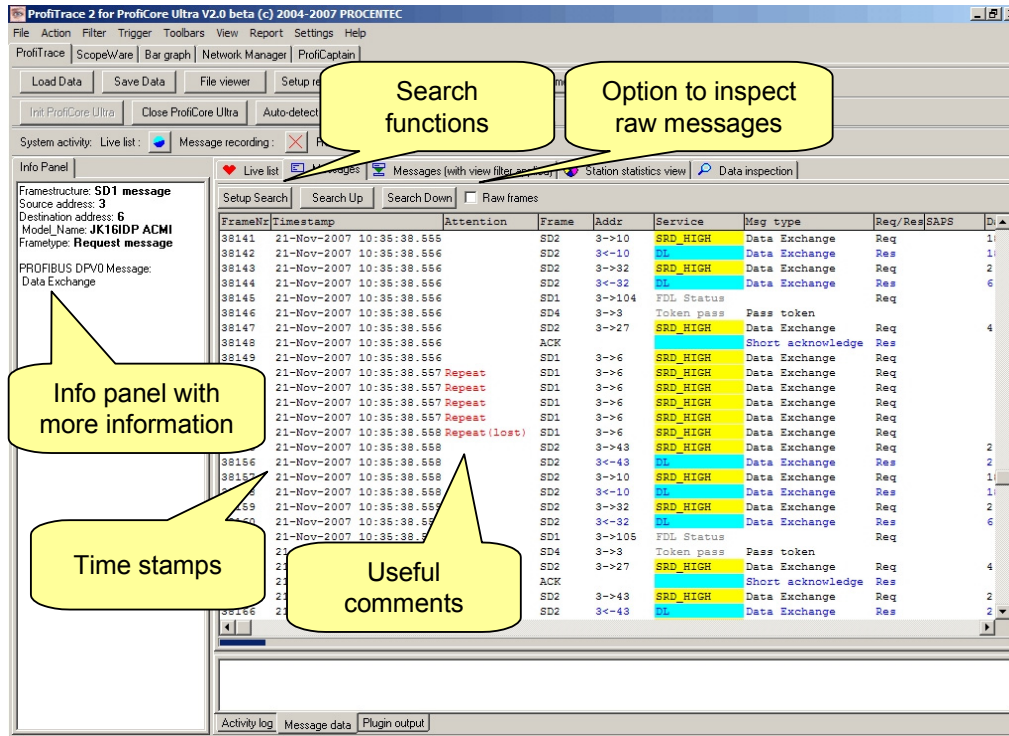


Fig. 19 – ProfiTrace message recording

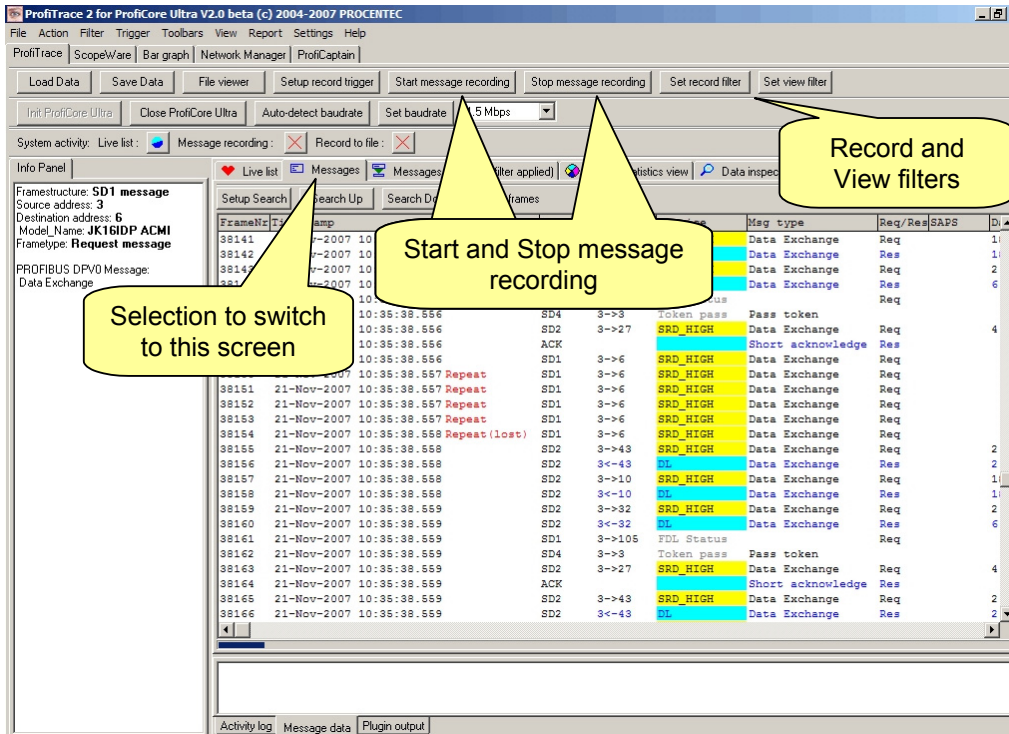
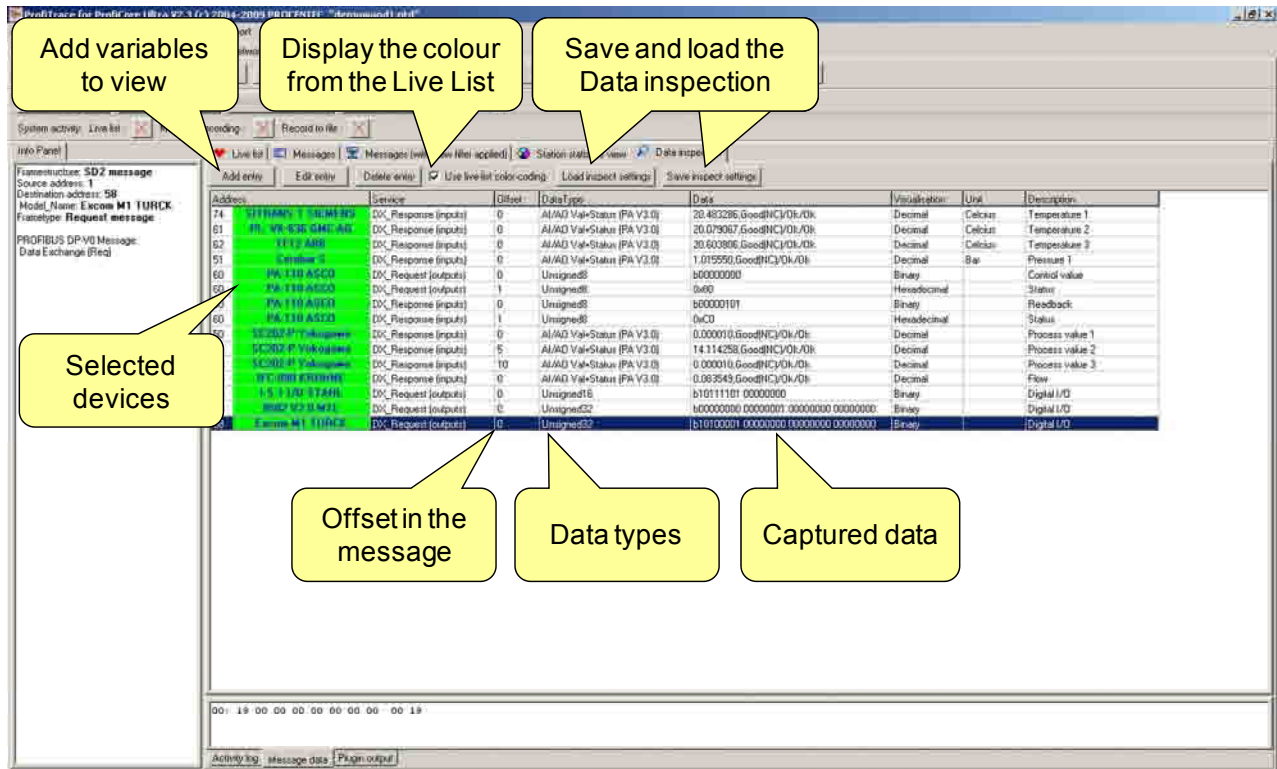


Fig. 18 - ProfiTrace message recording

5.3.4 Data inspection

The data inspection is a tool that permanently displays the latest captured data of selected variables in from the Data Exchange messages in a number of formats and views.



5.4 ScopeWare

"The easiest oscilloscope ever....."

The ScopeWare is a real-time oscilloscope for the inspection of the signal quality. After selecting this tab the first time after starting ProfiTrace, the oscilloscope runs immediately in differential mode, displaying all signals that are measured (see **Fig. 20**). The time base and voltage levels can easily be adjusted.

The screen refresh can be halted by clicking on "freeze".

By double-clicking on the devices in the Live List, the oscilloscope triggers on the respective device and only displays its signals. This is a perfect mode to inspect the signal quality for individual devices.

To display cursors for level and time analysis, click on "cursors".

To have the oscilloscope carry out an A and B measurement, select "mode". The oscilloscope will now display the A and B line separately.

A powerful feature of the oscilloscope is the Bit Interpretation Engine. It displays the bits that ProfiTrace detects on the bus. The end user can compare this with the signals that are measured with the oscilloscope and make a judgment about the signal quality (see **Fig. 21**).

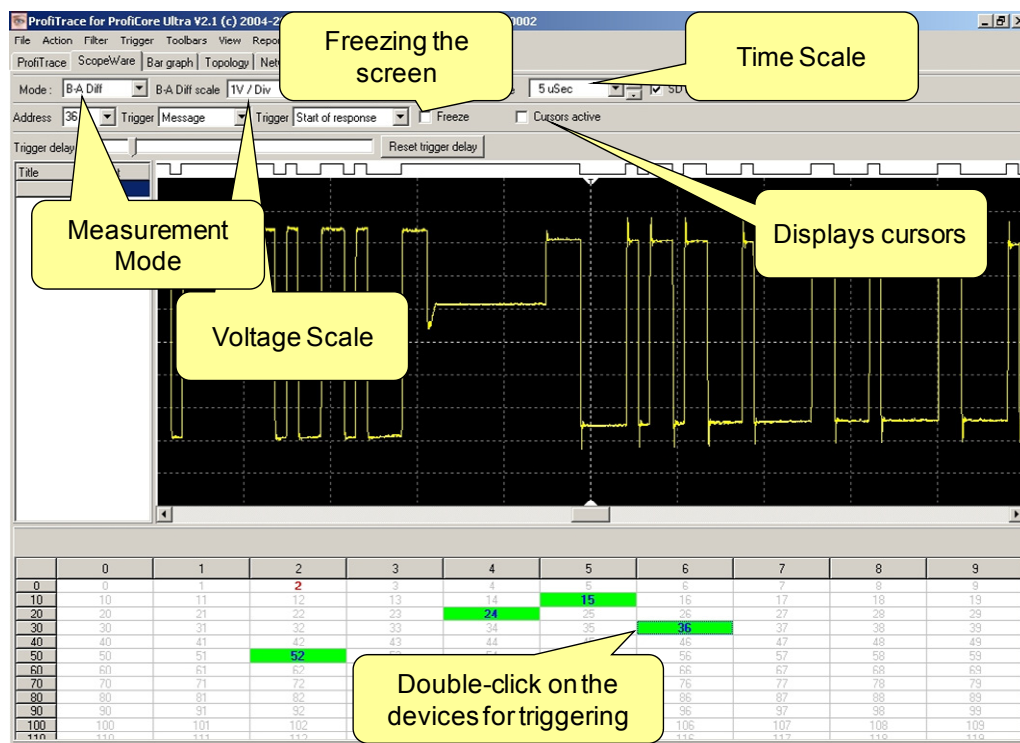


Fig. 20 – ScopeWare

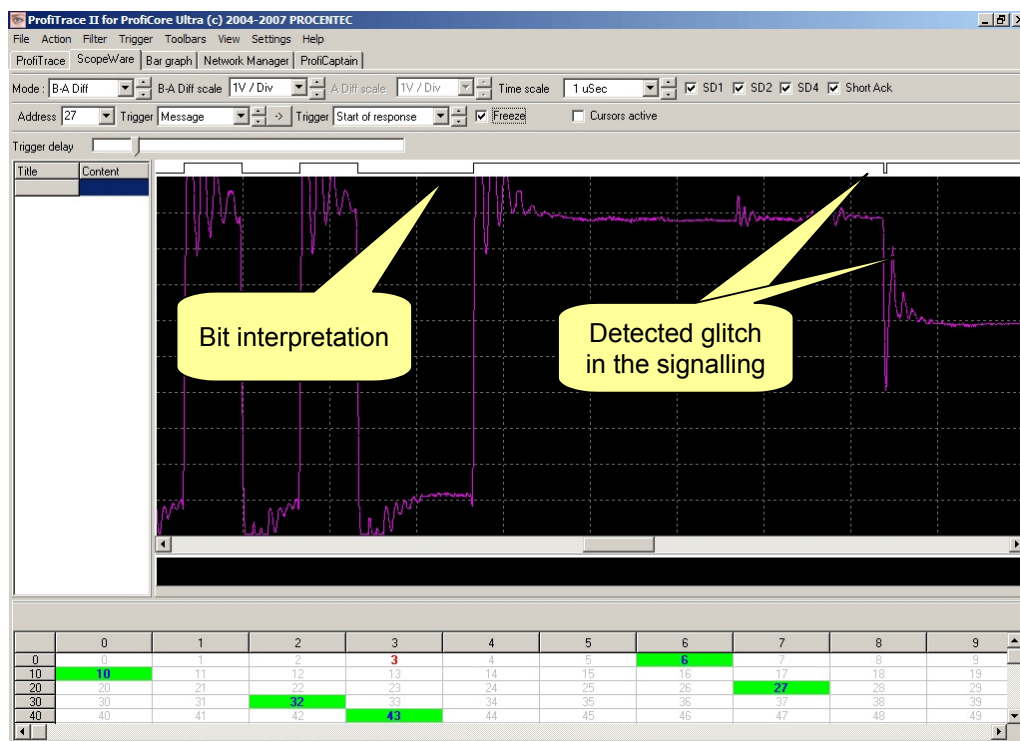


Fig. 21 – Bit interpretation

5.5 Bar graph

The Bar graph illustrates the average signal strength from all available devices (see Fig. 22). It is a helpful utility to get an impression of the overall signal quality of the network.

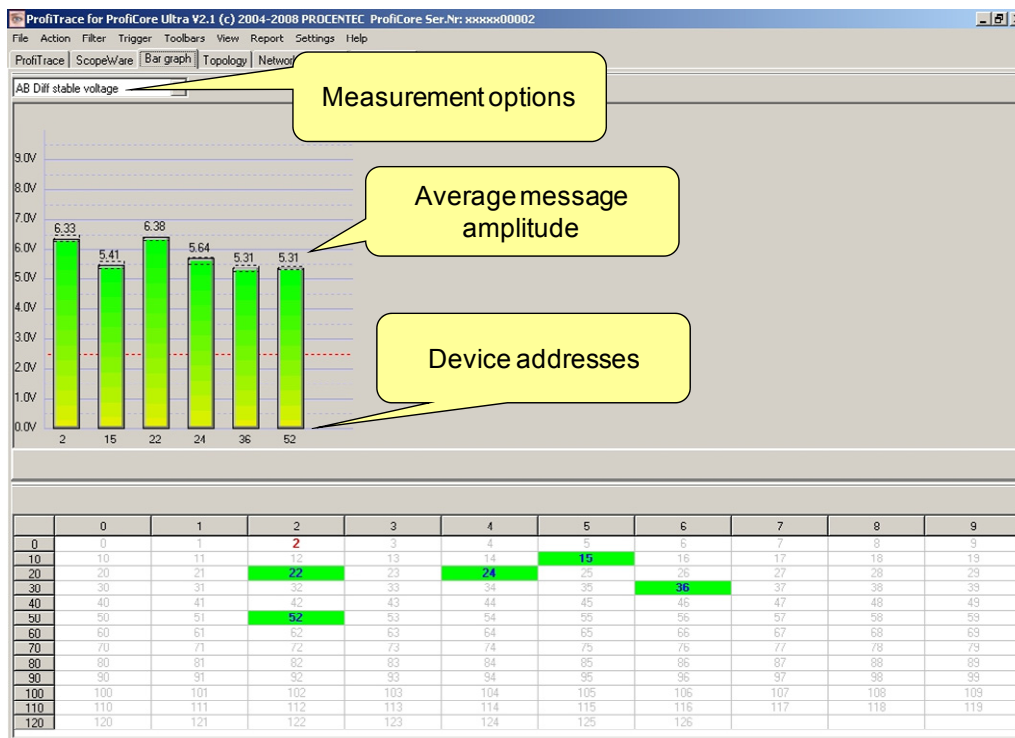


Fig. 22 – Bar graph

The average amplitude should be around 5 V. When there are bus problems the Bar graph will display different Voltage levels and the colour of the bars will change.

Fig. 23 shows an example of the Bar graph when the bus cable is missing termination or when there is a wire break. The voltage levels are much higher because of the extensive reflections.

Fig. 24 shows an example of the Bar graph when there is low impedance or short-circuit in the bus cable. The voltages are lower than normal and some bars are coloured red.

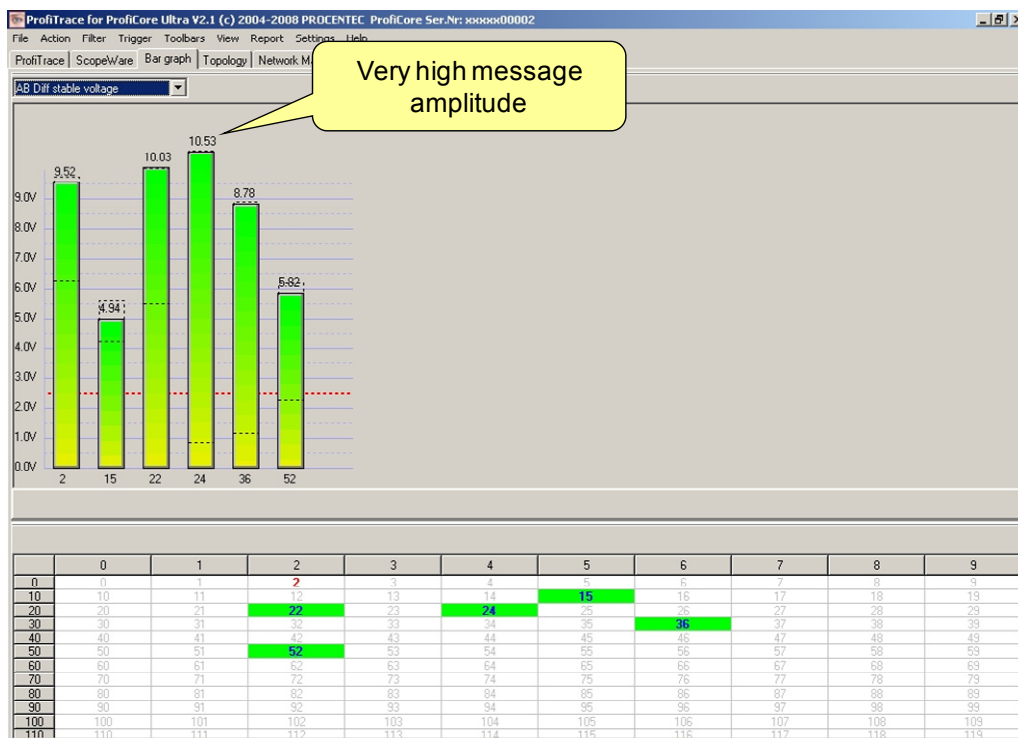


Fig. 23 – Bar graph when it senses missing termination or a wire break

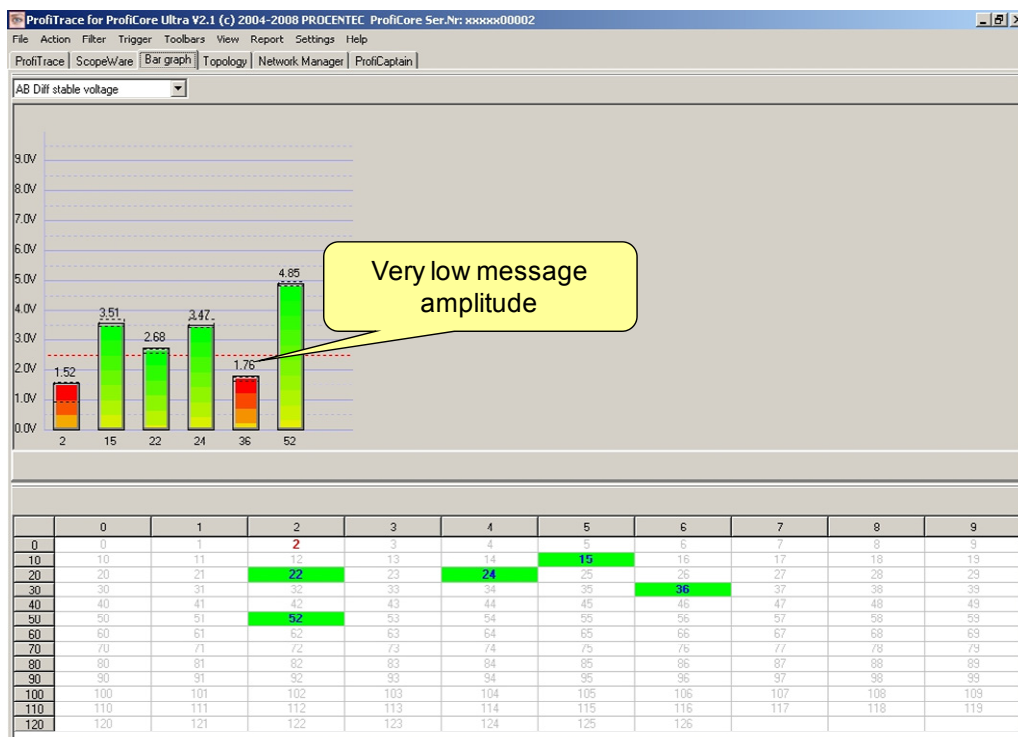


Fig. 24 – Bar graph when it senses a low impedance

5.5.1 Bar graph Modes

The Bar graph has 2 modes:

- AB Differential voltage
- AB Diff stable voltage

'AB Differential voltage' is the average amplitude of the signal and 'AB Diff stable voltage' is the minimum measured amplitude.

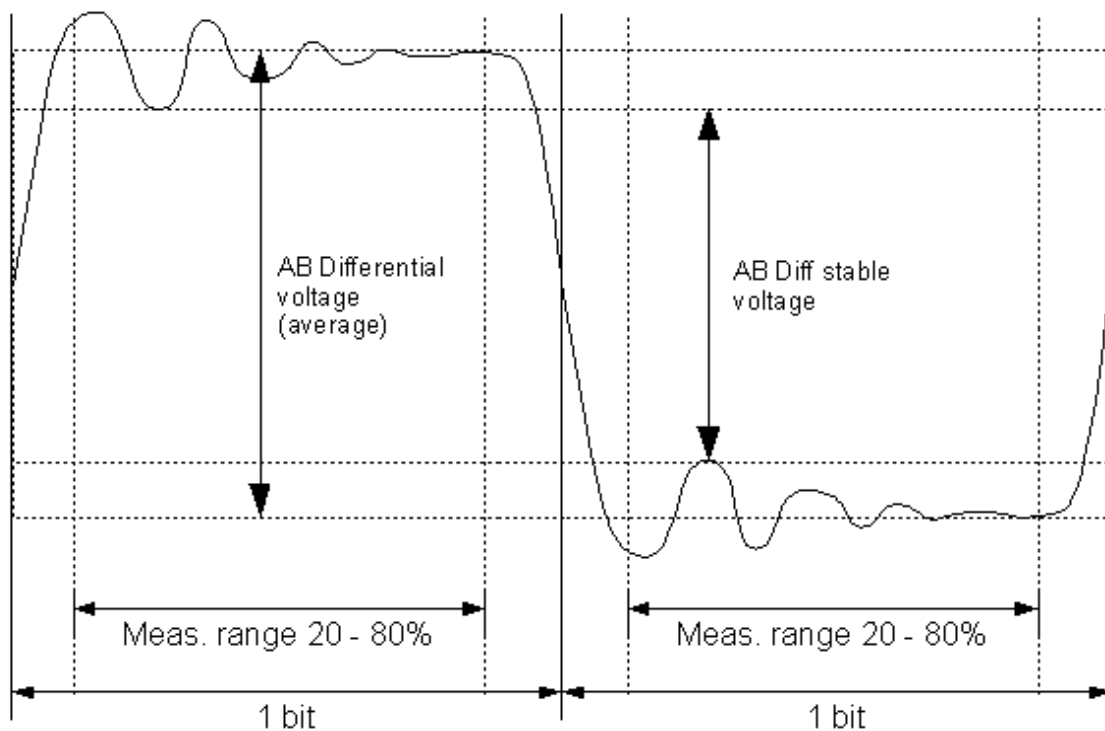


Fig. 25 – Measurement principle of the Bar graph modes

AB Differential voltage

The average voltage of the '1' part and '0' part is determined. The difference in voltage is the AB Differential voltage. This mode is useful to see if the general voltage of a device is not too low, maybe caused by long cable, wrong cable or a faulty bus interface.

AB Diff stable voltage

The lowest voltage of the '1' part is determined and the highest voltage of the '0' part is determined. The difference is the AB Diff stable voltage. This mode is useful to detect reflections on the bus that might corrupt the integrity of the signals (bit interpretation). Missing terminators can cause the voltages to go too low 'inside' the 1 and 0-bit, making the value lower than usual.

For both modes only the range between 20 and 80 % of the bit time is considered so that 'normal' rise and fall times do influence the results. If a value becomes lower than 2,5 V the specific bar will become red instead of green.

5.6 Topology scan

ProfiTrace has the capability to generate the topology of the PROFIBUS network without shutting down the installation! The Topology scan creates a clear network drawing that contains the location of the devices and length of the cable that links them (see Fig. 26).

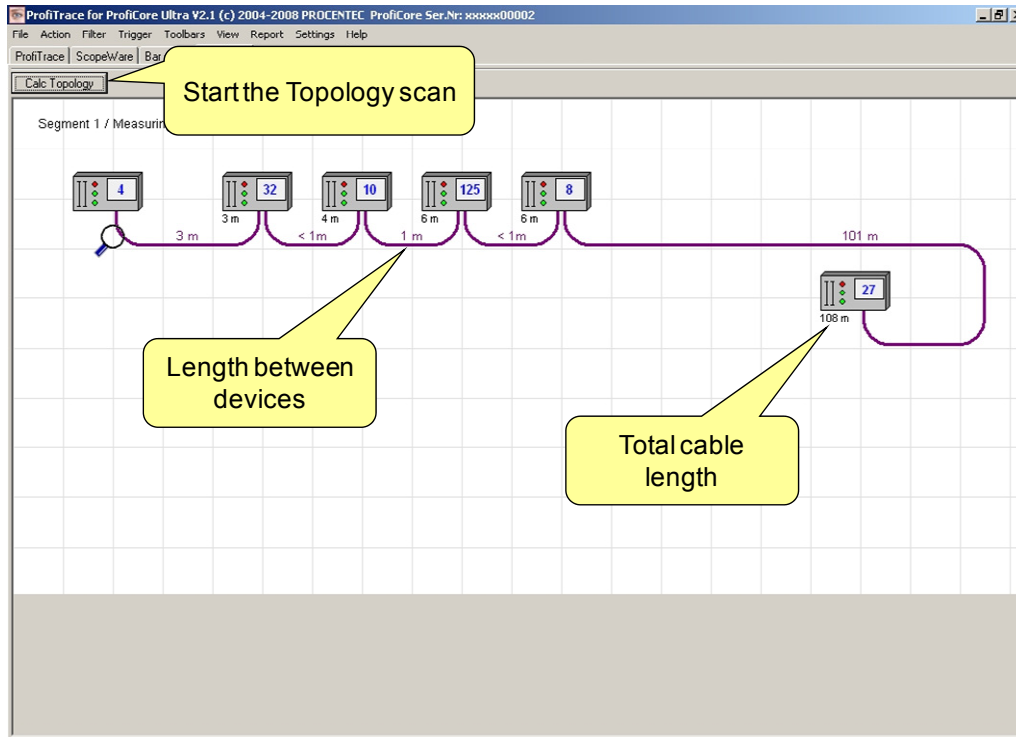


Fig. 26 - Topology scan

5.6.1 Restrictions for using the topology scan

- Topology detection only works on 500 kbps and 1,5 Mbps.
- ProfiCore Ultra must be connected to the beginning or the end of the segment.
- You must know on which station address the ProfiCore Ultra is connected.
- Distances < 2 m or > 230 m (relative to the measurement point) cannot be measured reliably.
- The segment must be without disturbances (spurs, noise, incorrect termination, etc.).
- The segments/network must be installed according to the PROFIBUS installation guidelines.
- It is assumed that there is at least 1 meter of cable between the stations.
- Only the stations in the current segment/measurement point are calculated.
- You must know which devices are physically connected to the current segment and which are NOT!

5.7 ProfiCaptain

"Test and control your devices....."

ProfiCaptain is a PROFIBUS DP class 1 and 2 master that has been designed for applications like: I/O tests, commissioning, parameterization and demonstrations. It fills the gaps that other products leave open and makes working with PROFIBUS a lot easier, faster and more fun. The main platform is a configuration environment in which the user can setup his slaves with the respective modules and parameters (See **Fig. 27**). After setting up the master, the user converts the slaves to Data Exchange without compilation or download.



ProfiCaptain is a master that sends information on the bus. The user should be aware of the consequences in multi-master networks when the baudrate and/or busparameters are not set correctly.

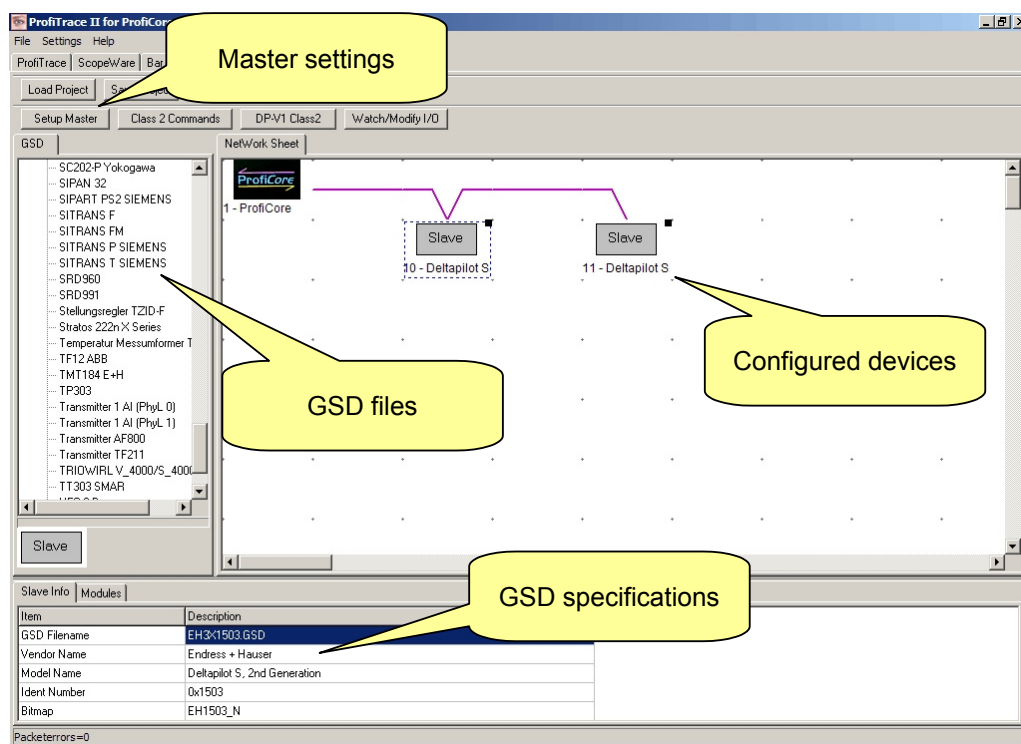


Fig. 27 – ProfiCaptain configuration utility

It is very easy to watch and manipulate I/O. If needed, class 2 functions and DP-V1 services can be applied on all devices in the network, even when they are not configured or belong to another master (see **Fig. 28**).

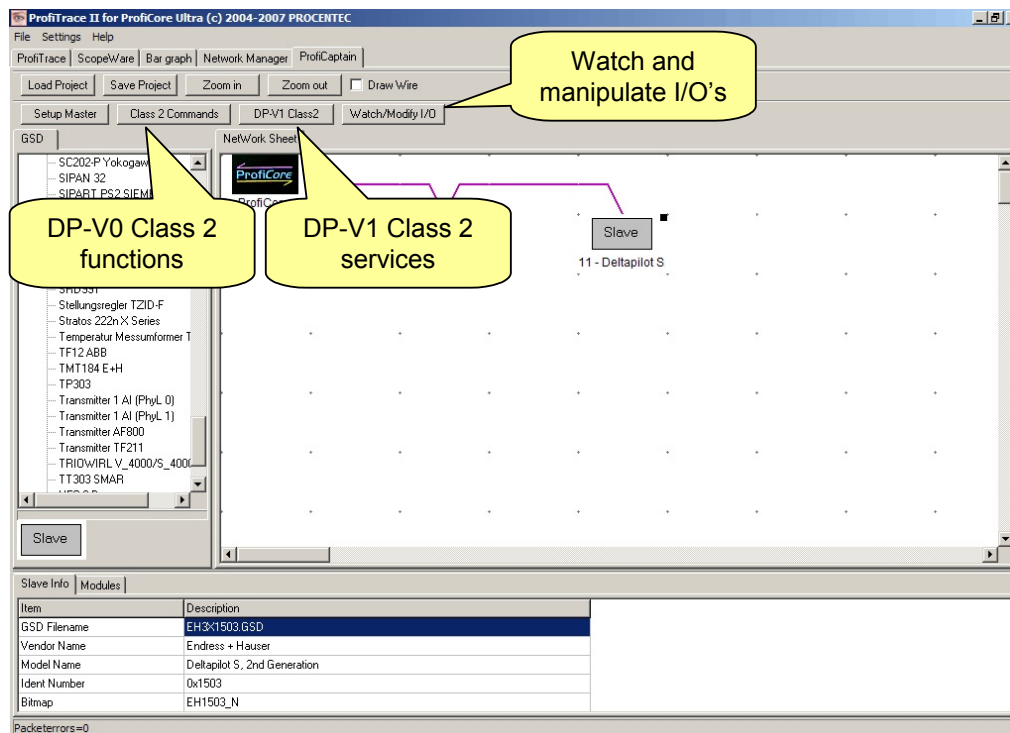


Fig. 28 – ProfiCaptain special functions

5.8 Report generation

“We’ve got proof.....”

The reporting feature creates a detailed report that contains the electrical signals of all devices, their faults, the network topology, bar graph and administrative information. On the front page it provides a conclusion if the installation is approved or not.

Click on “Report” to start the report generation (See **Fig. 29**).

After filling in some administrative information the report is generated immediately. The results can be printed to any installed printer driver (also PDF).

Fig. 30 Shows a screenshot of the first page of a report.

Fig. 31 Shows a screenshot from an oscilloscope measurement in the report.

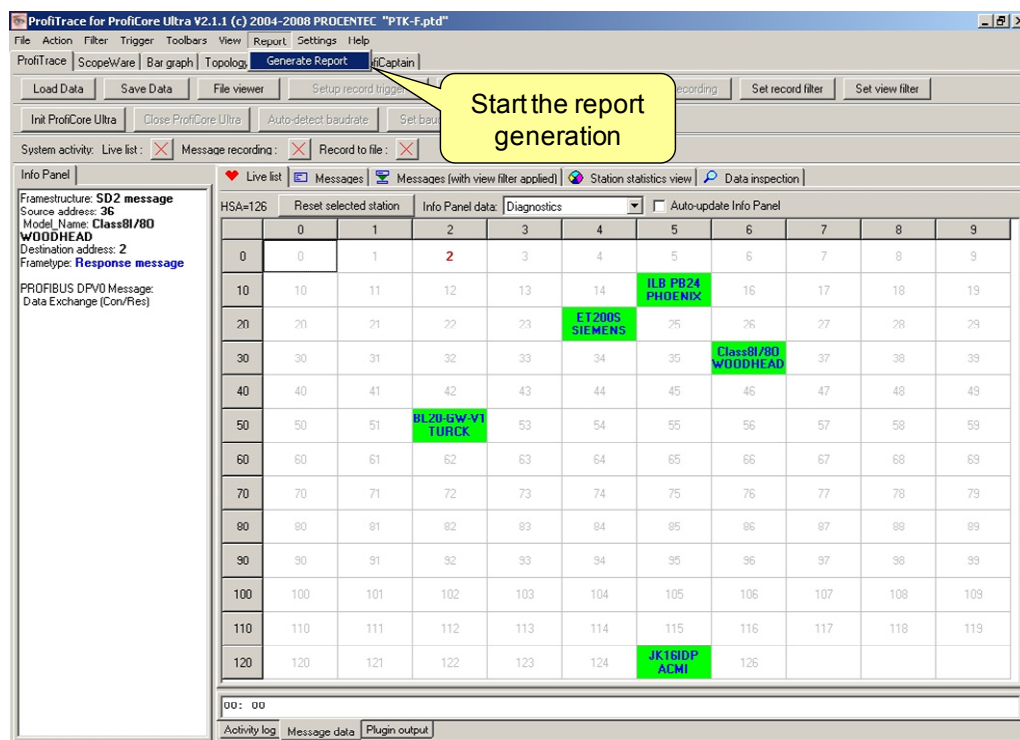


Fig. 29 - Start the report generation

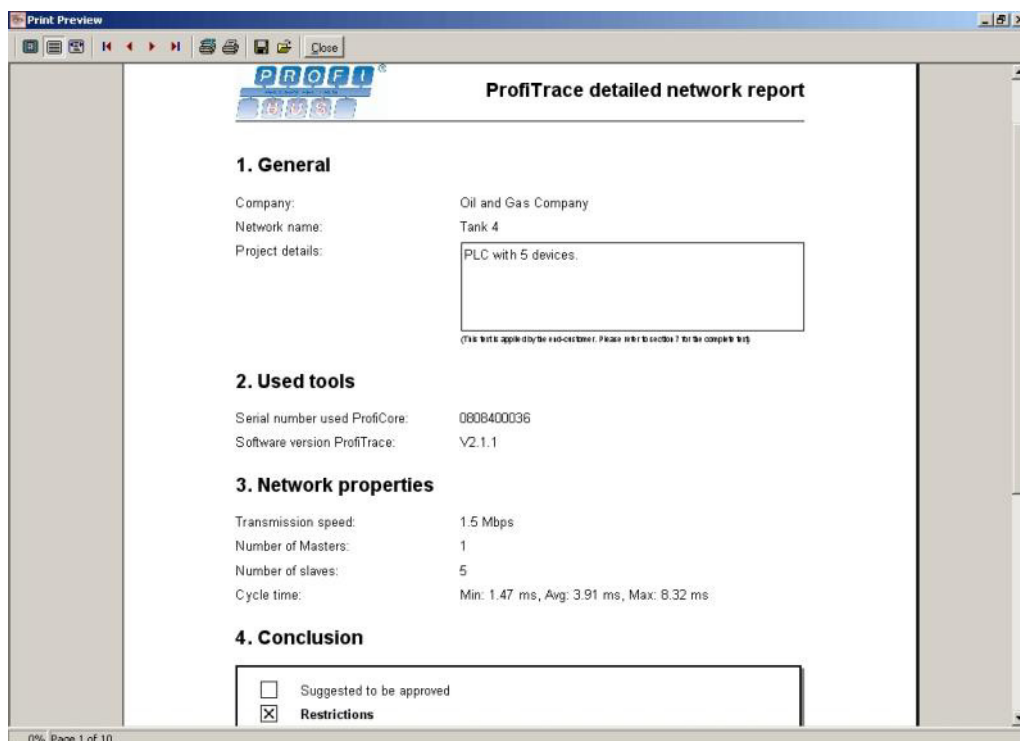


Fig. 30 – First page of the report with conclusion and administration

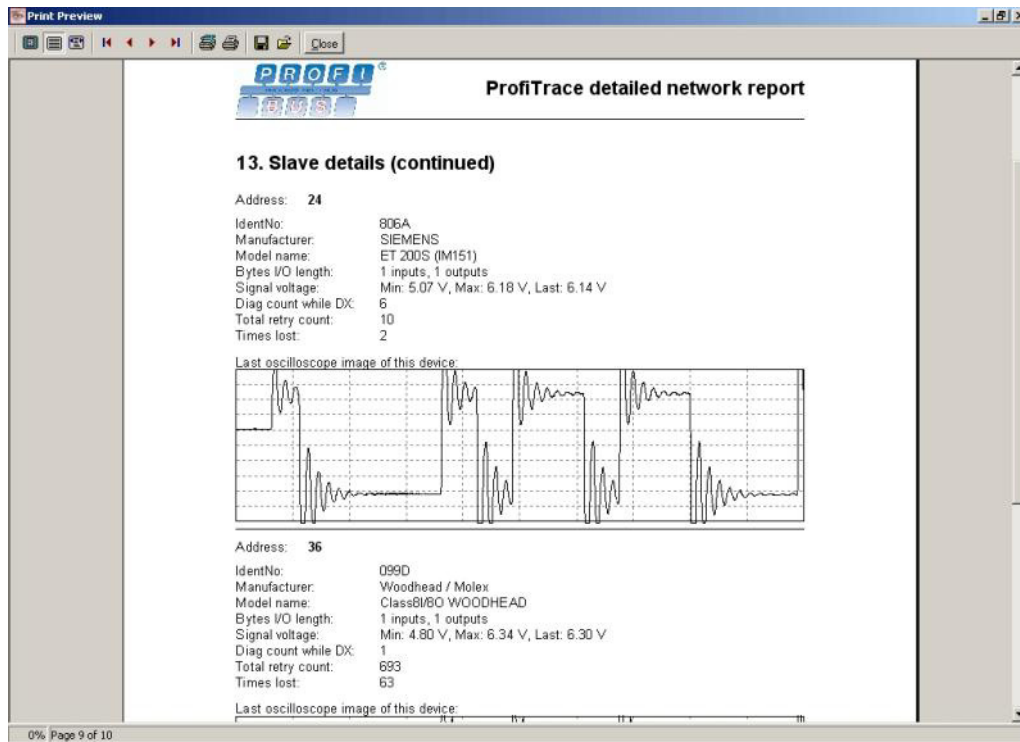


Fig. 31 - Oscilloscope measurements in the reports

6 Message and file recording

To start a message recording select ProfiTrace and click on messages. The button start message recording will start recording messages to memory (see Fig. 32).

The message view shows the messages currently recorded. The cursor can be used to navigate through the list. The info panel will show information of the current selected message. You can toggle between the non filtered and filtered view using the F6 button which also synchronizes the cursors if possible.

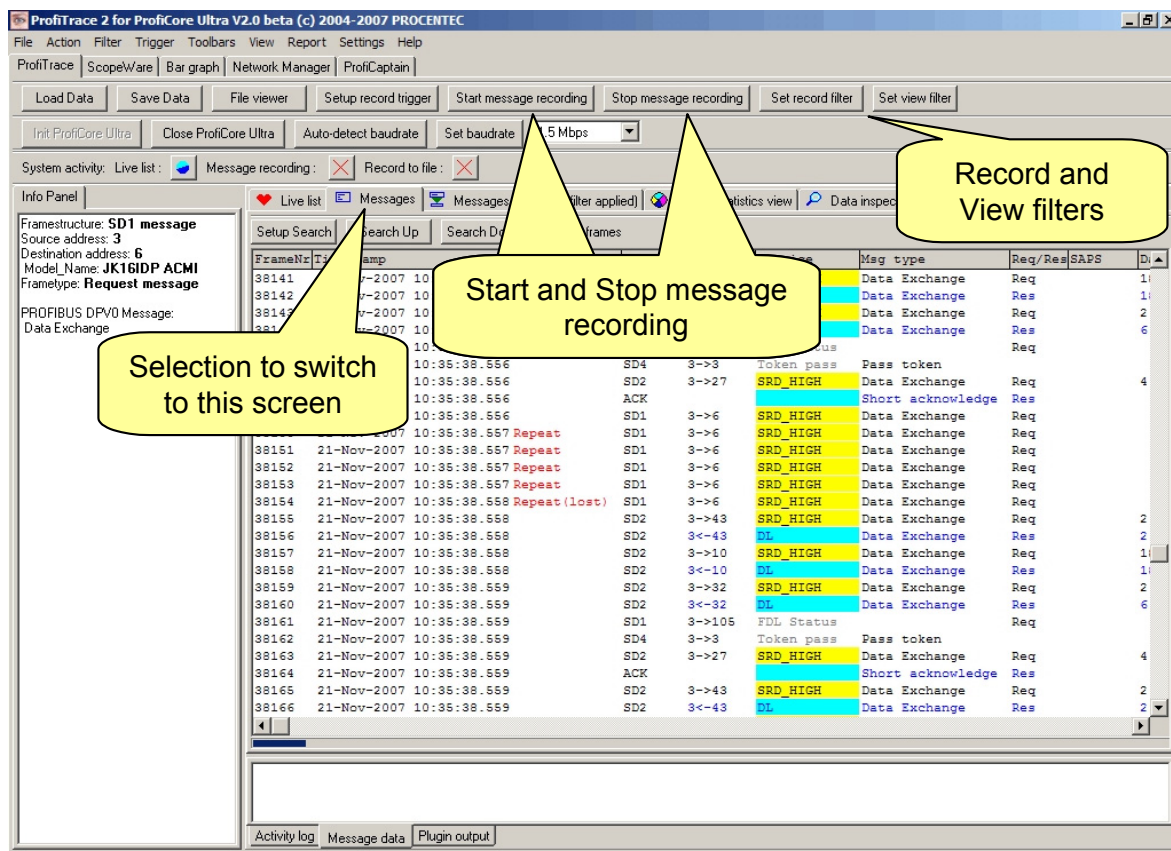


Fig. 32 - Message recording

On the bottom a blue progress bar is shown to indicate how full the message buffer is. When the progress bar fills the whole width the message buffer is full. If required the message buffer size can be increased in the general preferences. By default 1 000 000 messages can be recorded with the message recording utility. If more are required, use the file recording utility.

6.1 Message columns

The selection and order of the message columns (headers) can be customized by the user. **Fig. 33** illustrates an example of some displayed columns in the message recording.

FrameNr	Timestamp	Attention	Frame	Addr	Service	Msg type	Req/Res	SAPS	Datalen	Data
5714	20-Dec...		SD2	1<-60	DL	Data Exchange	Res		2	05 C0
5715	20-Dec...		SD2	1->59	SRD_HIGH	Data Exchange	Req		2	00 00
5716	20-Dec...		SD2	1<-59	DL	Data Exchange	Res		22	00 00 02
5717	20-Dec...		SD2	1->58	SRD_HIGH	Data Exchange	Req		10	FF 00 00
5718	20-Dec...		SD2	1<-58	DL	Data Exchange	Res		10	00 00 00
5719	20-Dec...		SD2	1->57	SRD_HIGH	Data Exchange	Req		4	00 00 00
5720	20-Dec...	Repeat	SD2	1->57	SRD_HIGH	Data Exchange	Req		4	00 00 00
5721	20-Dec...		SD2	1<-57	DL	Data Exchange	Res		4	39 62 0E
5722	20-Dec...		SD1	1->56	SRD_HIGH	Data Exchange	Req			
5723	20-Dec...		SD2	1<-56	DL	Data Exchange	Res		4	23 EF 1C
5724	20-Dec...		SD2	1->54	SRD_HIGH	Get Diagnostics	Req	62->60	0	
5725	20-Dec...		SD2	1<-54	DL	Get Diagnostics	Res	62<-60	17	00 0C 00
5726	20-Dec...		SD1	1->53	SRD_HIGH	Data Exchange	Req			
5727	20-Dec...		SD2	1<-53	DL	Data Exchange	Res		5	BB 44 9B
5728	20-Dec...		SD1	1->52	SRD_HIGH	Data Exchange	Req			
5729	20-Dec...		SD2	1<-52	DL	Data Exchange	Res		5	3D 75 C2

Fig. 33 - Example of selected message columns

The following columns can be selected for the message recording field:

Column	Description	Units
Line	The Line header specifies the line number in the respective view. This line number is independent of settings, filtering and such.	
FrameNr	The FrameNr header specifies the message sequence number and is used to indicate the sequence between individually sampled messages. The FrameNr is not necessarily consecutively numbered in a view, because filtering could have caused a message to be filtered out. If a bookmark is placed, additionally the text 'Bx' is shown in which x is the bookmark number.	
Timestamp	The timestamp is calculated on the basis of a starting moment the user has defined and subsequent messages add to a delta-bittime to this beginning. This means that the timestamp internally consists of 2 parts: the time/date and the delta-bittimes that have passed.	- 24-hour notation - Bit Time - Microseconds - Milliseconds - Seconds.
Deltatime	It is the time from the first start-bit of the previous message to the first start-bit of the current message. Note: Filtering of messages can cause this time be larger than expected with consecutive messages.	- Bit Time - Microseconds - Milliseconds - Seconds
Idletime	The Idle Time is the inactivity between 2 messages. It refers to the previous message and the time that has elapsed before the current message is send. If the current message is a response, it is called the slave Tsdr (slave response time).	- Bit Time - Microseconds - Milliseconds - Seconds

Column	Description	Units
Attention	The Attention header gives more information on the message or possible reason for a disturbance or error in the recorded message. (See paragraph 6.1.1 - Attention column)	
Frame	The 'Frame' specifies the frame type of the message. (See paragraph 6.1.2 - Frame column)	
Addr	The 'Addr' column specifies the source and destination address of the message. Requests: Source -> Destination Responses: Destination <- Source An ACK message does not contain addresses, so this field will be empty.	
Service	The Service column specifies the type of service of a message. The information is extracted from the FC byte when available (only valid for SD1,SD2 or SD3 messages). (See paragraph 6.1.3 - Service column (for requests) and 6.1.4 - Service column (for responses))	
Msg Type	The Msg Type column specifies the higher level DP, DP-V1 and DP-V2 messages. (See paragraph 6.1.5 - Msg Type values)	
Req/Res	The Req/Res column indicates a request or response message.	- Req - Res
SAPs	The SAPs column specifies the source and destination SAP of the message. Requests: Source SAP -> Destination SAP Responses: Destination SAP <- Source SAP	
DataLen	The DataLen column specifies length of the user data of a message (only valid for SD2 and SD3 messages and does not include SAPs).	- Decimal
Data	The Data column contains the USER DATA of a message. If the data is shown in RED it was interpreted to be invalid and displayed as RAW data. Please look in the 'Attention' column for the details.	- Hex - Decimal
Interpreter	This column interprets the content and meaning of the data. Particularly for PROFIBUS PA devices this is useful, as ProfiTrace can decode and visualize the floating point value and the description of the status byte. In order to do this, ProfiTrace needs to have sampled the Parameter message and Check Config message of a PA device.	
FC	FC byte of the message.	- Hex - Decimal
Station	Selectable keyword from the GSD file. This is only possible if a diagnostic message from this specific device has been scanned by ProfiTrace. By default the keyword 'Model_Name' is used.	

Column	Description	Units
SA	The source address of a message.	
DA	The destination address of a message.	
SSAP	The Source SAP of a message (only SD2 and SD3).	- Hex - Decimal
DSAP	The Destination SAP of a message (only SD2 and SD3).	- Hex - Decimal

6.1.1 Attention column

The attention column displays abnormalities that are detected in a specific message. For all cases it means **bad communication** (except bookmarks). The following items are specified:

Attention	Description
SYNC	A master is trying to contact a device for the first time. In most cases after station lost or device unavailability.
Repeat	The message is a repeat/retry of the previous message.
FCS Error	The checksum of the message is incorrect.
Wrong SD	The Start Delimiter is invalid.
Wrong ED	The End Delimiter of the message is invalid.
SD2 struct err	The second SD byte in the SD2 message is invalid.
SD2 rep err	The second LE byte in the SD2 message does NOT match the first.
SD2 LE err	The LE byte of an SD2 message is invalid or out of range.
Parity error	One or more bytes received in the message have parity errors.
Framing error	Framing error; Stop bit was NOT a logical '1'.
MBP Start Del	The PROFIBUS PA Start Delimiter is invalid.
MBP End Del	The PROFIBUS PA End Delimiter is invalid.
MBP frame err	The PROFIBUS PA formatting is invalid or incorrect (e.g. invalid transition).
MBP CRC err	The PROFIBUS PA CRC is invalid.
Bookmark X	Indicates a bookmark on this frame nr (only shown if it is not an error message, repeat or sync).
Overrun error	The information transferred from the ProfiCore Ultra to the PC was not fast enough in order to be processed completely.

6.1.2 Frame column

PROFIBUS has defined the following message frames:

Frame	Description
SD2	The SD2 message contains 'user data' and is variable in size. It is the most common PROFIBUS message.
SD4	The SD4 message is a 'token' message. It is used to send the token to another master or to itself when there are no other masters active on the bus.
SD1	The SD1 message does not contain 'user data'. It is most of the time used to check if a device is available.
ACK	The ACK message is a single byte response message (also called ShortAck or 0xE5). The Ack message is used to positively acknowledge a request.
SD3	The SD3 message has a fixed size of 8 'user data' bytes. The SD3 message is NOT used anymore!

6.1.3 Service column (for requests)

PROFIBUS has defined the following request messages:

Service	Description	Remarks
Token pass	Token pass message.	Only with SD4 messages.
FDL Status	Identify a device on the bus.	Only with SD1 messages.
SRD_LOW	Send and Receive Data, low priority.	
SRD_HIGH	Send and Receive Data, high priority.	Most of the time output data to PROFIBUS DP/PA devices.
SDA_LOW	Send Data with Acknowledge, low priority.	NOT used by DP and PA.
SDA_HIGH	Send Data with Acknowledge, high priority.	NOT used by DP and PA.
SDN_LOW	Send Data with No acknowledge, low priority.	
SDN_HIGH	Send Data with No acknowledge, high priority.	Most of the time used for a Global Control Broadcast.
REQ_IDENT	Request identification.	
REQ_LSAP	Request LSAP.	
SRD_MCAST	Send and Receive Data Multicast (also used by DP-V2 devices to respond with a Data Exchange Broadcast).	

6.1.4 Service column (for responses)

The table below explains the possible values of the service types for response messages. The top part lists positive responses, the bottom part lists negative responses.

Service	Description	Remarks
DL	Data response, low priority. The device acknowledges correct reception of the message and returns a low priority response.	Most of the time used for a regular Data Exchange response.
DH	Data response, high priority. The device acknowledges correct reception of the message and returns a high priority response.	Most of the time used for a Data Exchange response and an indication that the device has diagnostics.
Passive	Identifies a slave device.	Response to an FDL Status Request.
Act. NRY	Identifies a master which is not ready to receive and carry the token.	
Act. RDY	Identifies a master which is ready to receive and carry the token.	
Active	Identifies a master which is in the Token ring.	
RR	Reject Resource. This can occur when the internal buffer of the device cannot contain either the data size of the request data or the communication handler is unable to process it because it is not fast enough.	Most of the time used when the GSD file is wrong and incorrect parameters are written.
RS	Reject Service. This can occur when a SAP (Service Access Point) at the device is not activated.	Most of the time used when the watchdog has run out.
RDL	Negative acknowledgement for sent data, resources of the remote FDL controller not available or not sufficient. Reply data with low priority available.	
RDH	Negative acknowledgement for sent data, resources of the remote FDL controller not available or not sufficient. Reply data with high priority available.	

6.1.5 Msg Type values

MSG Type	Description
PROFIBUS DP	
Data Exchange	This message is used to transfer I/O data from/to the DP slave.
Set Parameter	This message is used to set the parameters to the slave. The first 7 bytes are the mandatory part (containing a control byte, MinTsdr, Ident Number, Watchdog factor, and group assignment).
Check Config	This message is used to verify the desired modules and specify the size of the I/O data to be transferred in the Data Exchange message.
Get Diagnostics	<p>This message is used to signal to a master the current state of the DP slave. It is considered the most important message of the DP protocol. The diagnostics message gives information like:</p> <ul style="list-style-type: none"> - Parameter Fault (Ident number or user parameter are incorrect or not accepted) - Configuration Error (The module desired/selected is not supported) - Watchdog ON/OFF - Parameter Requested (The slave is ready to be (re-)parameterized) - Master address - Ident Number
Global Control	<p>This message is used to signal to a group DP slaves in one single message. The Global Control message can activate functions like:</p> <ul style="list-style-type: none"> - Sync (Activates the Sync mode, and causes the DP slave to update the slave output data to the slave application at that particular moment only) - Freeze (Activates the Freeze mode, and causes the DP slave to update its input data from the slave application at that particular moment only) - Unsync (De-activates the Sync mode) - UnFreeze (De-activates the Freeze mode) - Clear (Used to signal to all slave stations that the master is in the Clear mode)
Set Slave Address	This message is used to change the DP slave address. This function is used for devices that do not have dipswitches to setup the station address, or when dipswitches are not possible (due to ingress protection or physical limitations).
Get Config	Retrieves the configuration data from the DP slave.
Read Inputs	Retrieves the current input data from the DP slave.
Read Outputs	Retrieves the current output data from the DP slave.
PROFIBUS DP-V1	
DPV1_Initiate_Req	Initiates a class 2 acyclical connection with a DP-V1 device.
DPV1_Initiate_Res	Confirms that the class 2 acyclical connection request has been accepted.
DPV1_Initiate_NegRes	The class 2 acyclical connection request has not been accepted.

MSG Type	Description
DPV1_RM_Req	Returns information on the SAP to be used for the Class 2 acyclical connection.
DPV1_Abort_Req	Requests the closure of a Class 2 acyclical connection.
DPV1_Read_Req	Requests a read action on a particular slot and index.
DPV1_Read_Res	The response of a DPV1_Read_Req.
DPV1_Read_NegRes	Negative response indicating that the DPV1_Read_Req has failed. A reason code and classification is also returned to determine the problem.
DPV1_Write_Req	Request a write action on a particular slot and index.
DPV1_Write_Res	The result of the DPV1_Write_Req.
DPV1_Write_NegRes	Negative response indicating that the DPV1_Write_Req has failed. A reason code and classification is also returned to determine the problem.
DPV1_DataTransport_Req	Request a write action on a particular slot and index and for the station to respond with the data on the same slot and index.
DPV1_DataTransport_Res	The result of the DPV1_Transport_Req.
DPV1_DataTransport_NegRes	Negative response indicating that the DPV1_DataTransport_Req has failed. A reason code and classification is also returned to determine the problem.
DPV1_Idle_Req	The master maintaining the class 2 acyclical connection, indicates that there are no pending Read, Write or DataTransport commands, but the connection should remain open.
DPV1_Idle_Res	The class 2 connection remains open.
DPV1_Poll	Request the readiness of a pending Read, Write or DataTransport request.
PROFIBUS DP-V2	
DXB (broadcast)	Broadcasting Data Exchange data of a slave (publisher) to other slaves (subscribers) without having to go through the master first. It is also called 'Slave to Slave' communication.
Isochrone spare	Special FDL status request frame which is used for DP-V2 Isochrone mode. Its function is to produce bus activity in the spare time of an isochrone cycle to avoid a time out and to keep the cycle time constant.

7 Oscilloscope measurements (RS 485 – DP)

PROFIBUS DP is high-speed digital data communication, which means a multi-meter is NOT useable to measure the signal quality. An oscilloscope is required to verify the electrical signals on the cable and essential to detect; *noise, reflections, termination problems, wire breaks, etc.* The difficulty is; how to identify deviations.

This chapter describes example measurements on RS 485 – DP, which are made with ScopeWare. You can compare them with your measurements at an installation. Important is, that you are aware of the propagation time on the cable. With PROFIBUS this is about 4,2 ns/m. Disturbances travel with the same propagation time. By measuring the width of the reflections we can conclude where the disturbance is physically located. ScopeWare can do this calculation for you.

Before you continue reading make sure you understand ScopeWare by reading chapter 5.4 on page 43.

7.1 Acceptable signals

Acceptable signals are almost “real” square waves with average amplitude of 5 V. When the amplitude is higher and the signals appear to be square waves, it is still acceptable (modern RS 485 drivers can generate higher amplitudes). It is also important that the idle state has minimum noise and 1 V level (powered termination).

The spikes on the bits are normal and probably caused by the Tap Connector which is a small spur line. **Fig. 34** shows an example of acceptable signals in ScopeWare. **Fig. 22** shows an example of acceptable signals in the Bar graph.

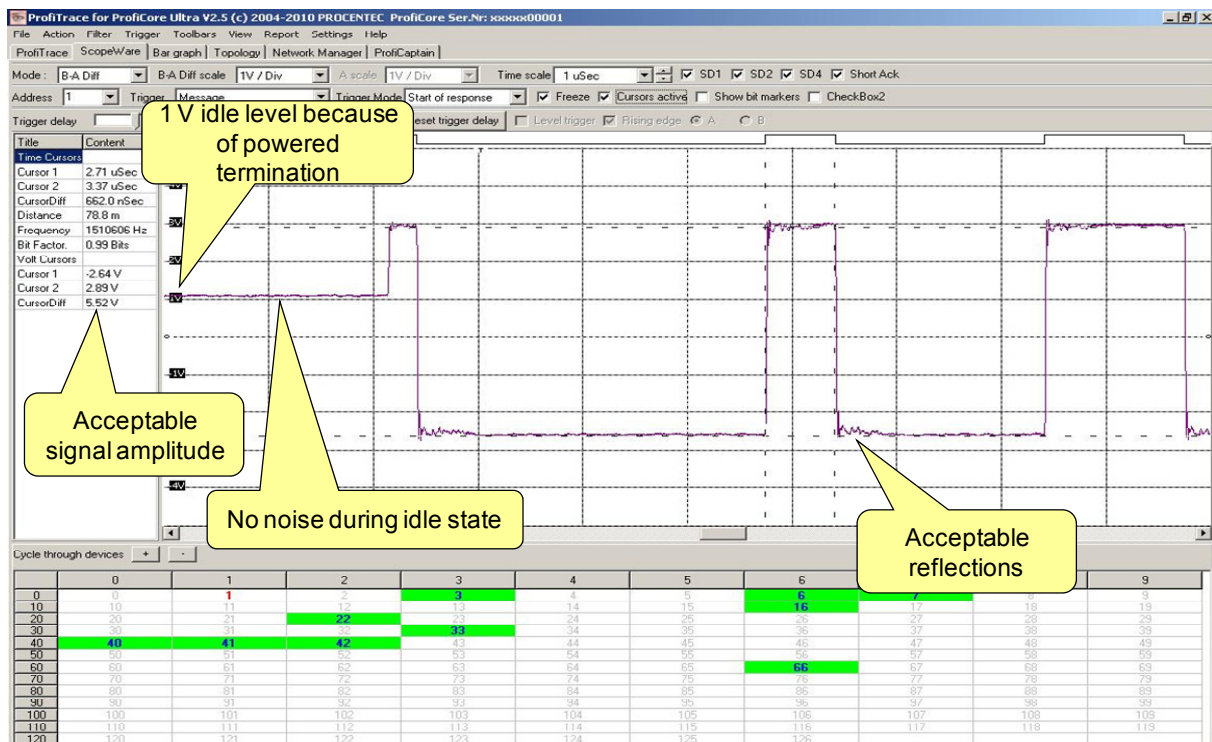


Fig. 34 – Acceptable RS 485 – DP Signals

When termination is missing or there is a wire break, the signals will reflect on the cable with an “up-down” effect. These reflections cause a rise in the average signal amplitude.

Address: [0x0] Trigger: Message Trigger Mode: Start of response ☒ Freeze ☒ Cursors active ☐ Show bit markers ☐ CheckBox2

Trigger delay: [] Reset trigger delay: ☐ Level trigger ☒ Rising edge ☐ A ☐ B

Title	Content
Time Cursor:	
Cursors:	\$31.4 nSec

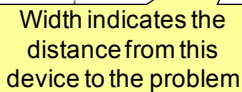


Fig. 35 – Termination missing or wire break



Make sure you know the last 2 devices on the segment and inspect both their signals. By means of the reflections you can easily track the cable towards the problem. The last 2 devices will also indicate the worst case reflections.

7.3 Short circuit between A and B

When there is a short circuit between the A and B line, the reflection will step by step crash the signal to very low amplitude. The width of the steps can tell us the distance to the “problem point”. When the distance is nearby, the reflections are compressed in the bit.

The short circuit also causes the idle line to be completely crashed.

Fig. 36 shows an example of a short circuit between A and B.

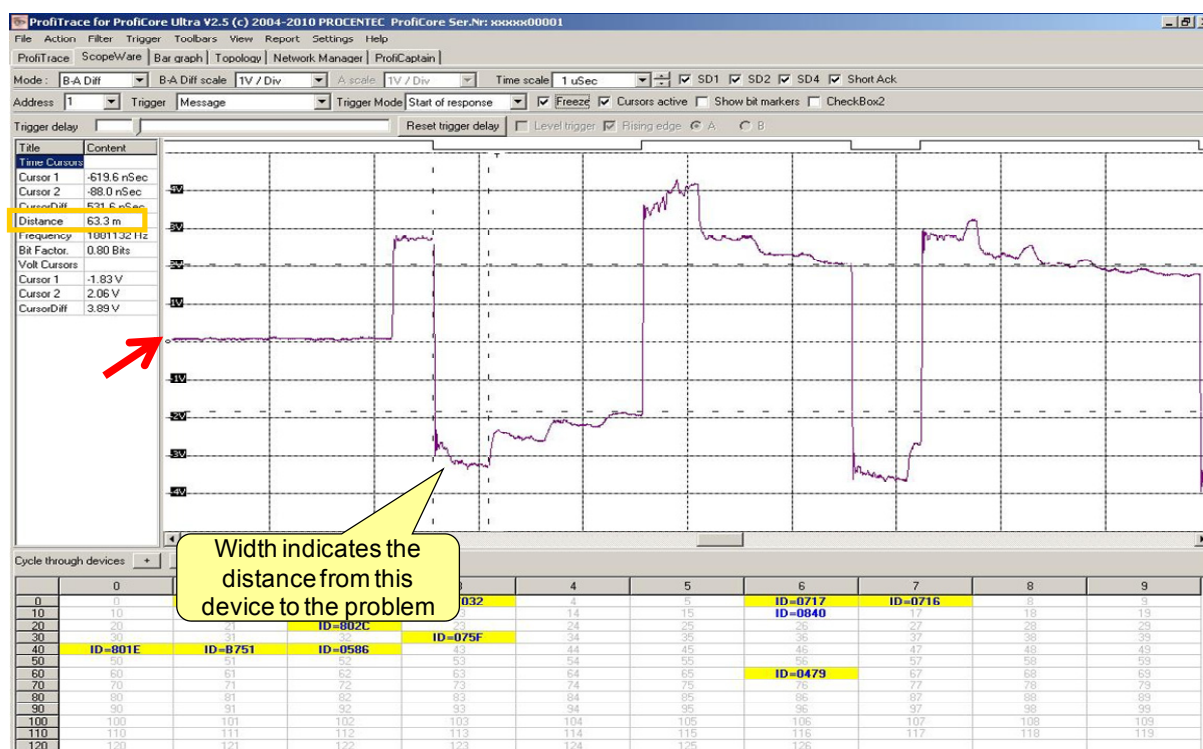


Fig. 36 – Short circuit between the A and B line

When the distance is far, the reflections end up in the adjacent bits, but the signal amplitude does not crash completely. The loop resistance causes residue amplitude that could be enough for the devices to remain in Data Exchange.



Make sure you know the last 2 devices on the segment and inspect both their signals. By means of the reflections you can easily track the cable towards the problem. The last 2 devices will also indicate the worst case reflections.

7.4 Short circuit between B and Shield

A short circuit between B and Shield (same as A and Shield) will show a small deviation in the signal and is difficult to diagnose (see Fig. 37).

An easier method is to switch ScopeWare to the A&B mode. In this mode you will see the individual A and B signal. Here you can clearly see an abnormality (see Fig. 38).

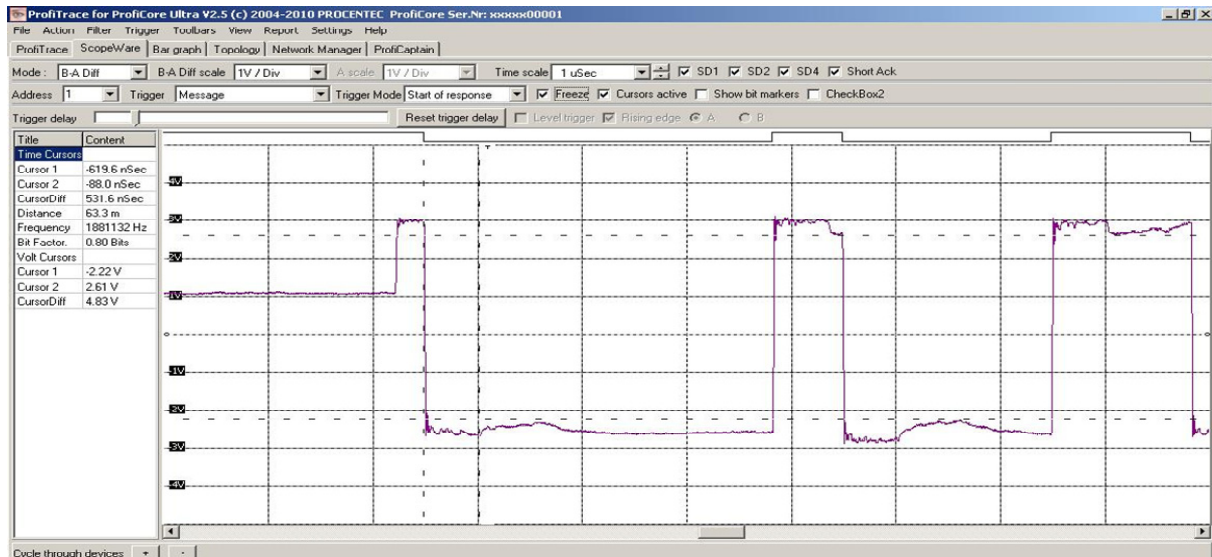


Fig. 37 - Short circuit (B-Shield) Diff

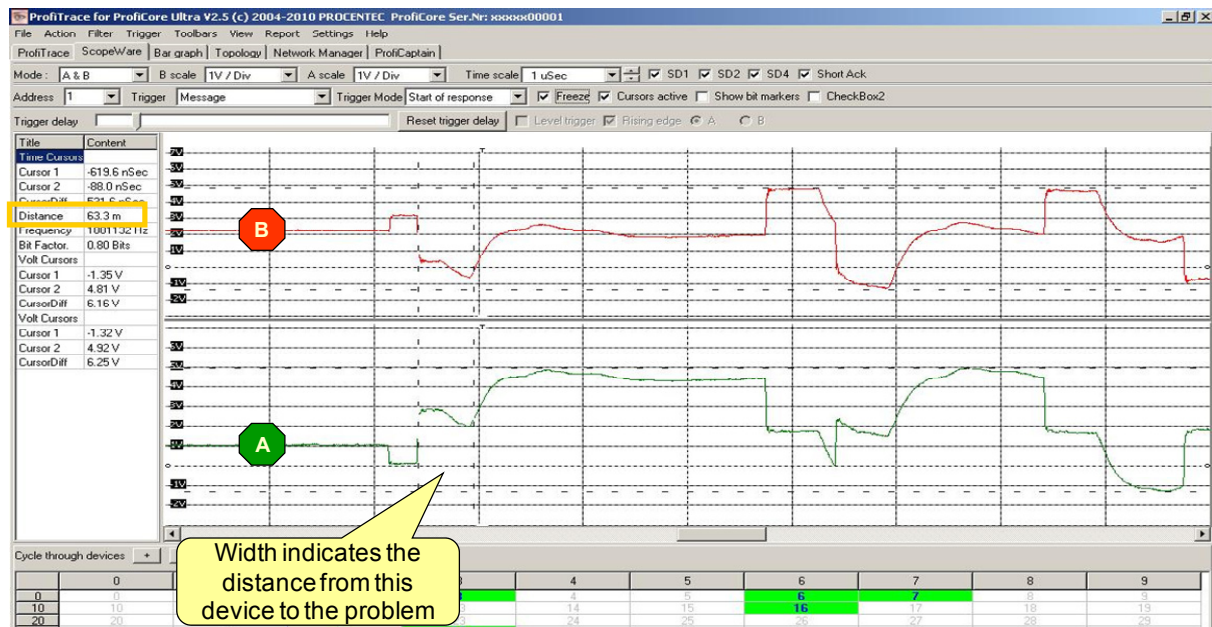


Fig. 38 - Short circuit (B-Shield) A&B

7.5 Too many terminators

Too many terminators show a middle way between a good signal and a short circuit between A&B. The signals face a low impedance, but mostly stable enough to keep on running. The reflection only consists of a small “bump”. The width of the reflection can tell us the distance to the unwanted termination.

The additional termination also causes the idle line to have a lower voltage.

Fig. 39 shows an example of “too many termination”.

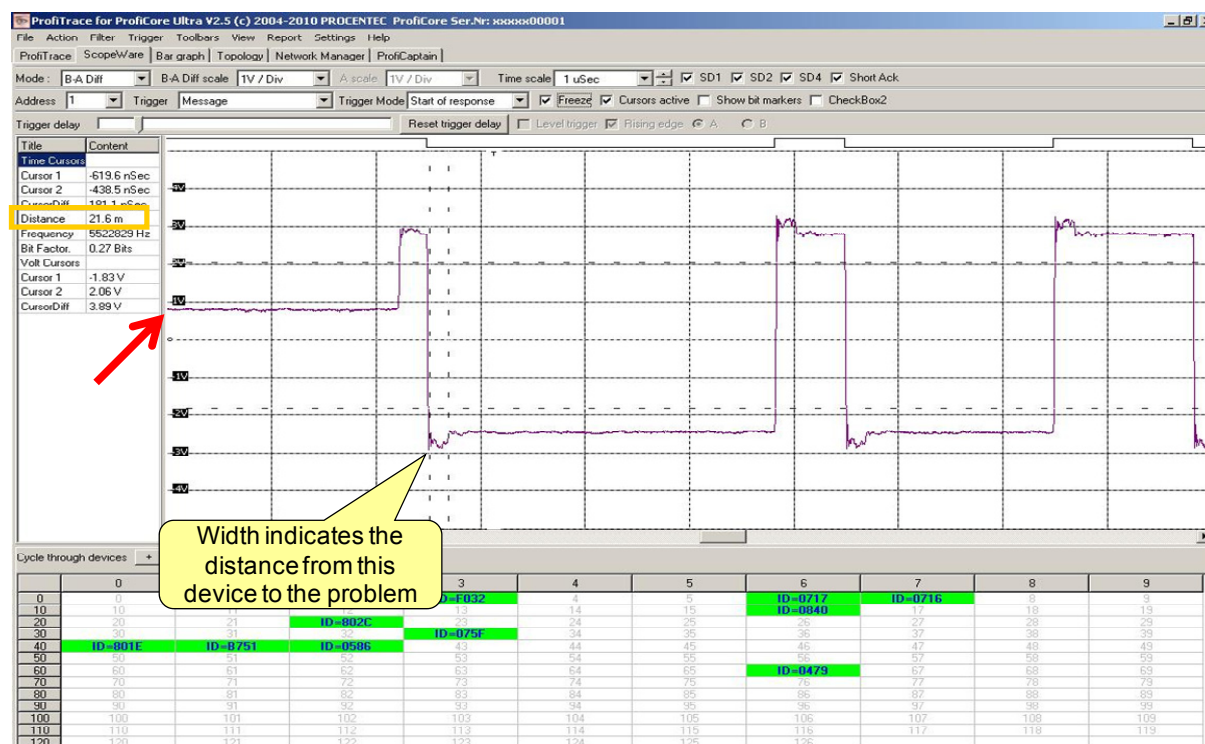


Fig. 39 - Too many termination

7.6 Not powered termination

Not powered termination will show a small deviation in the signal and is difficult to diagnose by means of the reflection. An easier method is to look at the idle line. Instead of being 1 V, it is now going in the direction of 0,5 V when you have 1 termination that is not powered. It will be 0 V when both are not powered. **Fig. 40** shows an example of a termination that is not powered.

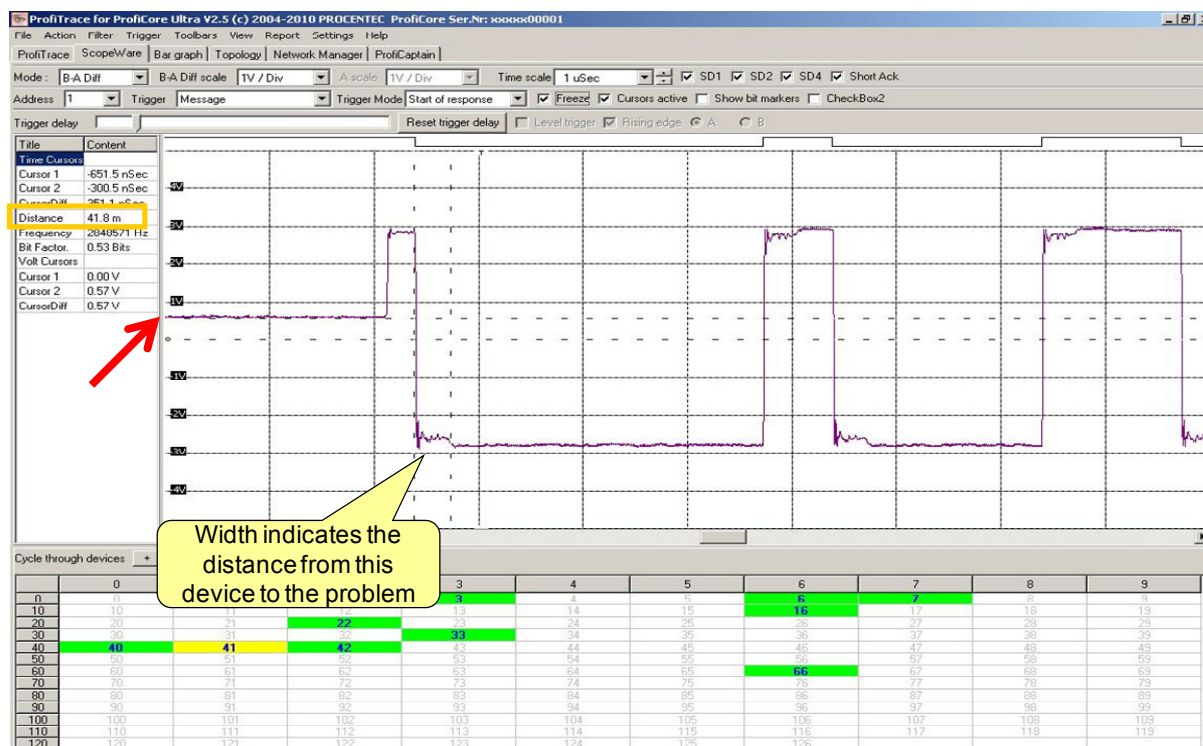


Fig. 40 - Not powered termination

7.7 EMC/EMI

EMC/EMI disturbances are easy to recognize. The deviations in the signals pop up on irregular places. With the static disturbances like termination fault or short circuits, it is visible in every bit. **Fig. 41** and **Fig. 42** show an example of typical EMC/EMI disturbances.

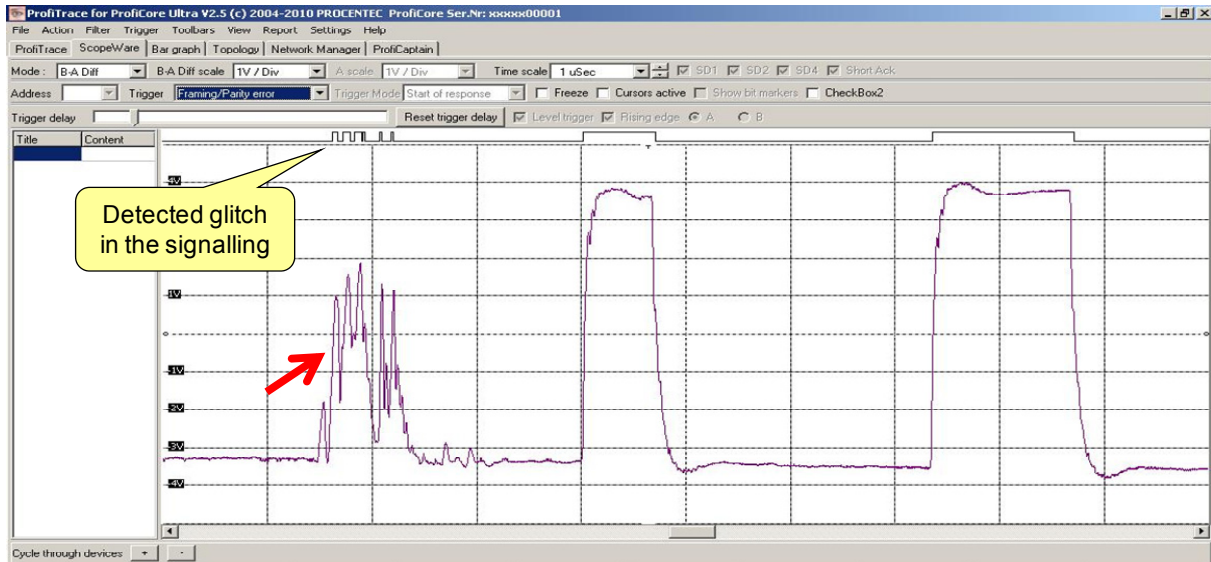


Fig. 41 - EMC/EMI disturbances



Fig. 42 - EMC/EMI disturbances

8 Oscilloscope measurements (MBP – PA)

With PROFIBUS PA the focus is more on the analysis of AC and DC signals. We want to know if the DC level is stable and if the quality of the AC signals is acceptable compared with the noise on the cable.

8.1 Acceptable signals

When the PA Probe Ultra is connected directly on the DP/PA coupler, the DC Voltage should be constant and between 12 V to 32 V (dependant on the Ex zone). At the end of the cable it should be higher than the lowest dropout Voltage of the PA instruments (normally between 9 to 11 V).

The AC signals should be between 750 mV to 1 V (with a proper terminated network). When the amplitude is much high it could be that termination is missing.

The noise level should be less than 150 mV (preferably less than 75 mV).

The bias should be less than 50 mV (difference between top and bottom signal).

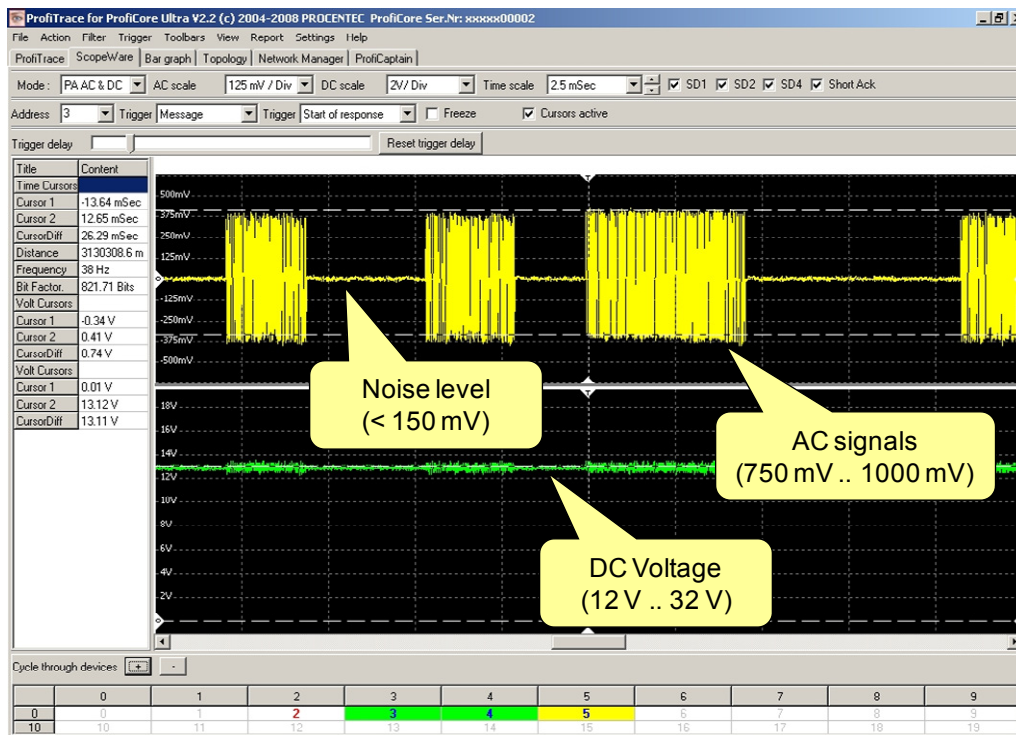


Fig. 43 - AC and DC measurement

9 ProfiCaptain

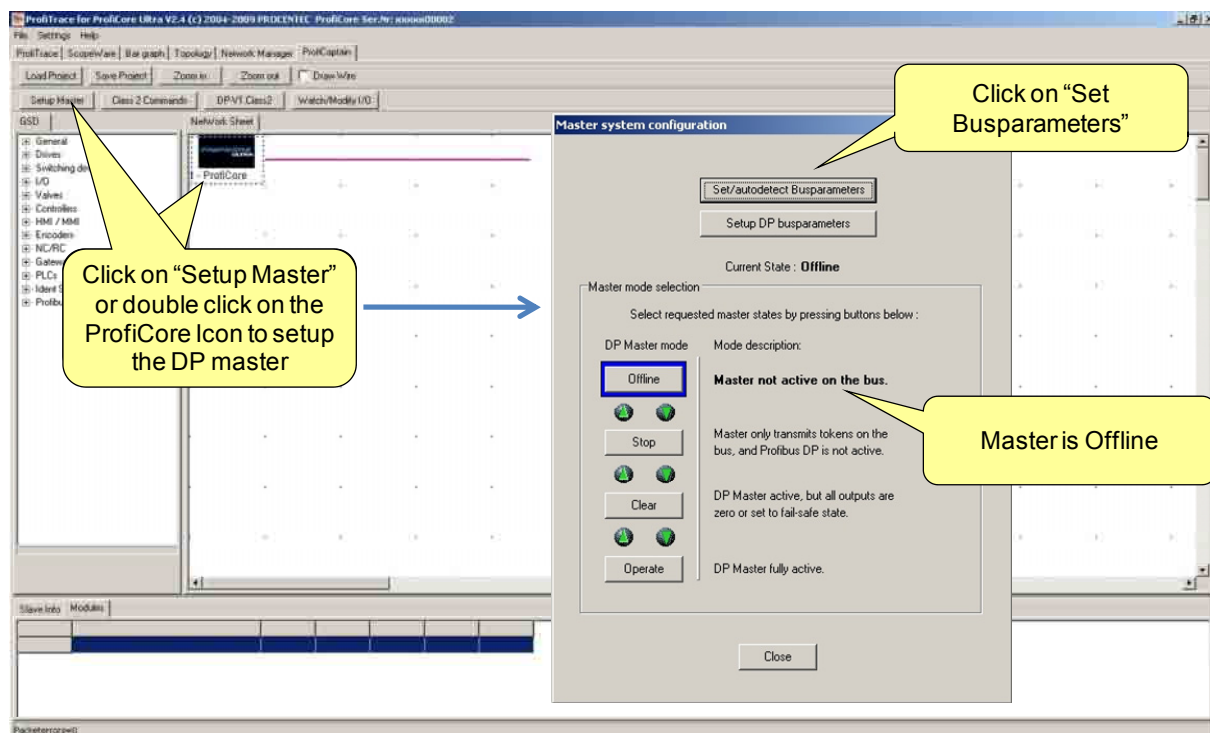
ProfiCaptain is a PROFIBUS DP class 1 and 2 master that has been designed for applications like: I/O tests, commissioning, parameterization and demonstrations. It fills the gaps that other products leave open and makes working with PROFIBUS a lot easier, faster and more fun. The main platform is a configuration environment in which the user can setup his slaves with the respective modules and parameters. After setting up the master, the user converts the slaves to Data Exchange without compilation or download.



ProfiCaptain is a master that sends information on the bus. The user should be aware of the consequences in multi-master networks when the baudrate and/or busparameters are not set correctly.

9.1 Setting up the DP Master

A large part of the ProfiCaptain dialogs only work when the ProfiCore has been initialized in ProfiTrace (Click the **"Init ProfiCore"** button). After navigating the ProfiCaptain tab (see **Fig. 14**), a configuration environment will appear to setup slave devices for Data Exchange and to perform a-cyclical functions on available slave devices.



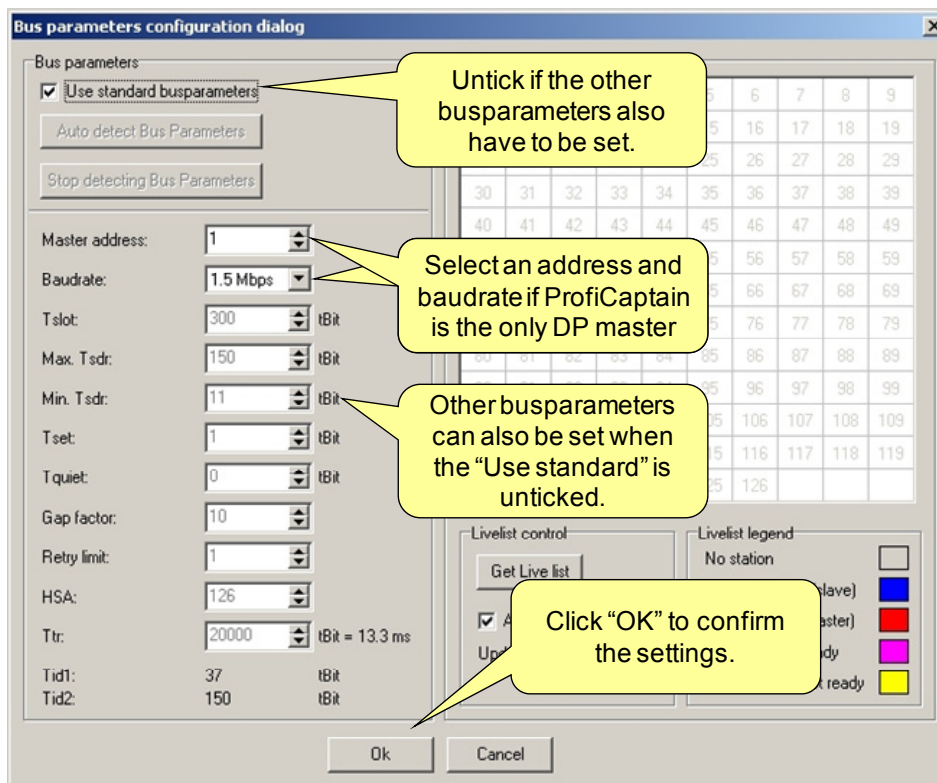
Click on **"Setup Master"** followed by **"Set/Autodetect Busparameters"**. The dialog should indicate that the master is Offline (no master activities).

It is now possible to go 2 directions;

- **9.1.1** Setting the busparameters manually (required when ProfiCaptain is the only master on the bus)
- **9.1.2** ProfiCaptain detects the busparameters automatically when it has to work in a multi-master environment.

9.1.1 Manual busparameter setting

This paragraph describes the manual setting of the busparameters. The simplest method is to select a baudrate and master address. Please skip this paragraph for automatic busparameter detection and proceed to paragraph **9.1.2**.



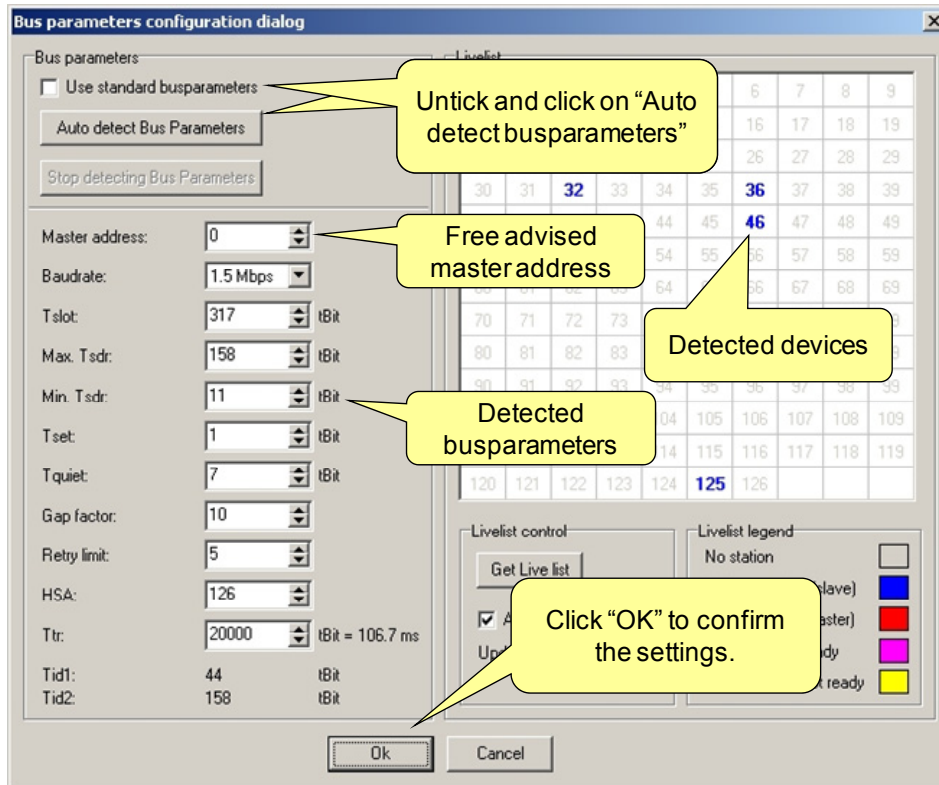
Set all the required items to the correct values and click **"OK"** to confirm.



The master is still NOT active on the bus! This has to be done in the next dialog.

9.1.2 Automatic busparameter detection

This paragraph describes the automatic busparameter detection. This mechanism is very powerful because the chance that ProfiCaptain corrupts the data communication in a running multi-master installation is extremely small.



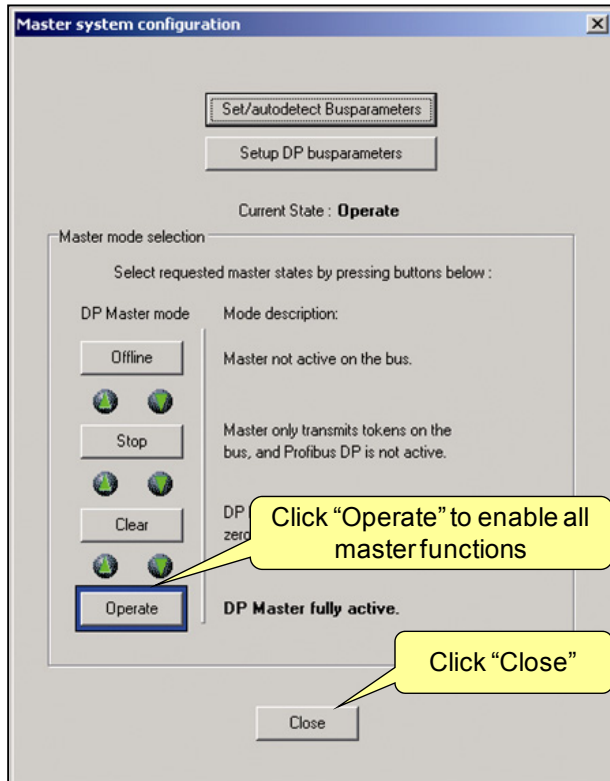
After clicking on **"Auto detect busparameters"**, ProfiCaptain will display the detected busparameters and advise a free available master address. It also fills a simple Live List with devices that show bus activity. From this point the user has also influence to alter the detected settings. Click **"OK"** to confirm.



The master is still NOT active on the bus! This has to be done in the next dialog.

9.1.3 Activate the DP master

The last step is to enable the master.



Click **“Operate”** to enable all master functions. Click **“OK”** to close the dialog.

The only method to stop the master is to click on **“Offline”** or **“Close ProfiCore”** in the ProfiTrace environment. The user can also select another master mode. Here is a small description of the master modes which are compliant with the PROFIBUS standard.

OFF-LINE

- No communication

STOP

- Token exchange + FDL_Status
- Class 2 communication
- No data exchange with the slaves

CLEAR

- Parameterization and configuration of slaves
- Data Exchange without outputs
 - Outputs = “0” (GSD keyword: Fail_Safe = 0)
 - No Outputs (GSD keyword: Fail_Safe = 1)
- Sends Global_Control_Command with “Clear” bit ON

OPERATE

- Parameterization and configuration of slaves
- Data Exchange with outputs
- Sends Global_Control_Command with “Clear” bit OFF

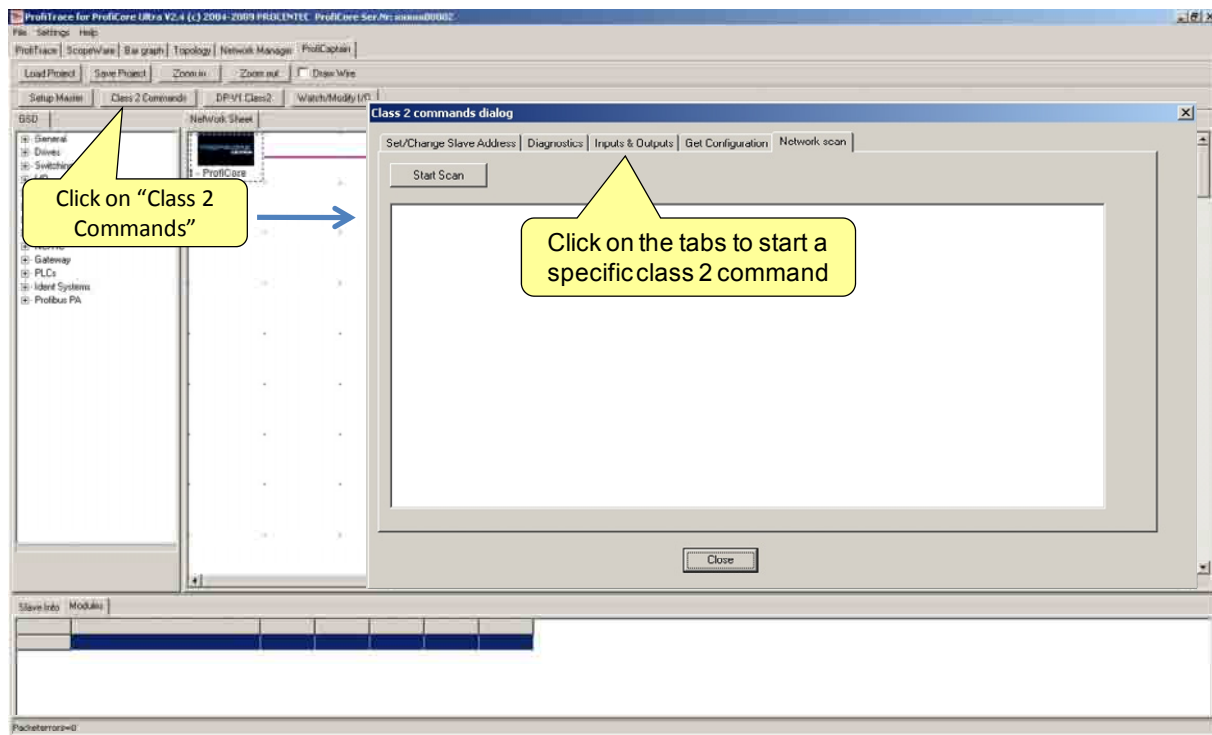
9.2 Class 2 DP-V0 functions

ProfiCaptain provides a simple user interface for DP-V0 class 2 commands to scan and diagnose devices on a passive or working network. The following class 2 services are available:

Read inputs, Read outputs, Get configuration, Set Slave Address, Get Diagnostics



ProfiCaptain will do only 1 class 2 function per token cycle. This is to keep the cycle time of the network as constant as possible. Class 2 functions can always be executed on all slave devices in the network without the need to configure these devices.



Click on “**Class 2 Commands**” to start the class 2 functions dialog. Click on one of the tabs in the dialog to select a class 2 function.

9.2.1 Network scan

The Network scan is a very useful feature to detect all the available slave devices in the network. After the scan has been started, ProfiCaptain will send a Get Diagnostic message to all addresses. The information from the responses of the available slave devices are listed in the dialog;

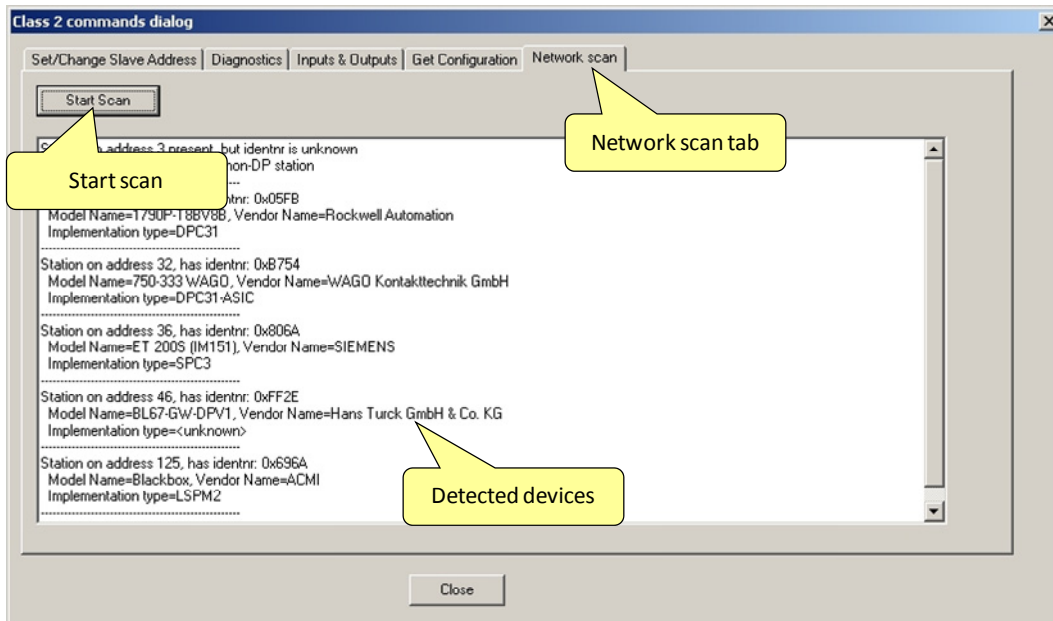
- Address
- Ident Number
- Model Name (*from the GSD file*)
- Vendor Name (*from the GSD file*)
- Implementation Type (*from the GSD file*)



If the GSD file of a detected device is not imported or the catalog has not been updated yet, the Model Name and Implementation Type are empty. See 3.10 for updating the catalog.



The network scan will now also fill the Live List of ProfiTrace with the device names. This is extremely useful.



Click on **“Start scan”** to start the scan.

9.2.2 Set Slave Address

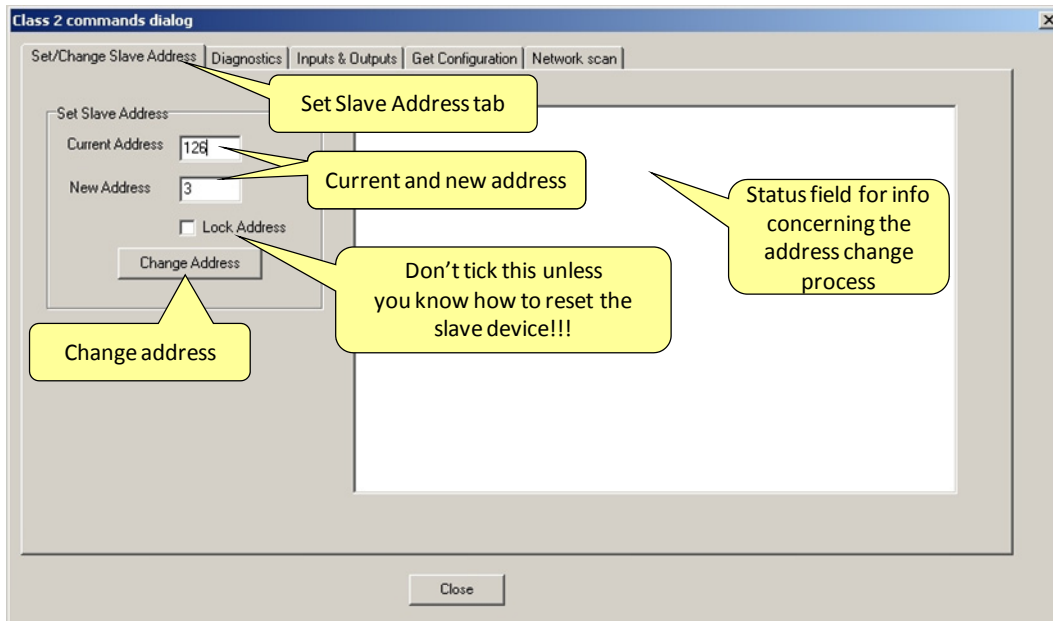
With the class 2 Set Slave Address function, ProfiCaptain can set a new bus address over the PROFIBUS at the slave device that support this feature. Most slave devices that support this function do not have dipswitches or rotary switches. PA devices must support it.



The default address for new or serviced devices is 126. ProfiCaptain offers you the option to set devices back to 126. It depends on the slave device if it has to be powered down/up to adapt the new address.



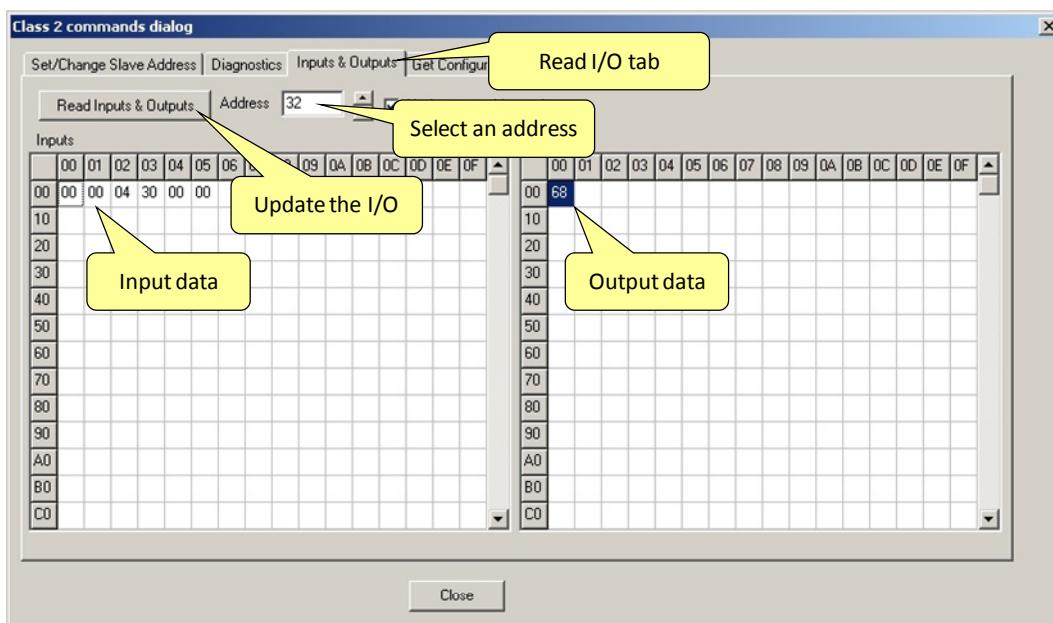
A ‘Lock’ feature (Address change) is available to block further address changes at the slave device (dangerous!).



Select the current and new address and click on **“Change Address”** to confirm.

9.2.3 Read Input & Read Output

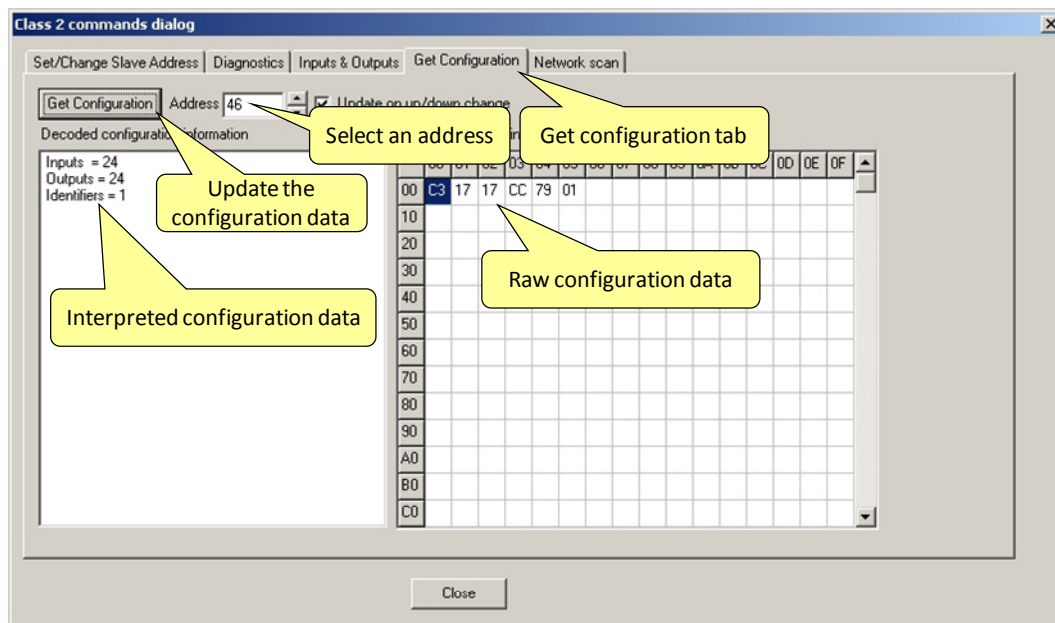
With the class 2 Read Input & Read Output function, ProfiCaptain reads out the last update of the input & output data from a slave device.



Select an address and click on **“Read Input & Outputs”** to update the I/O data.

9.2.4 Get Configuration

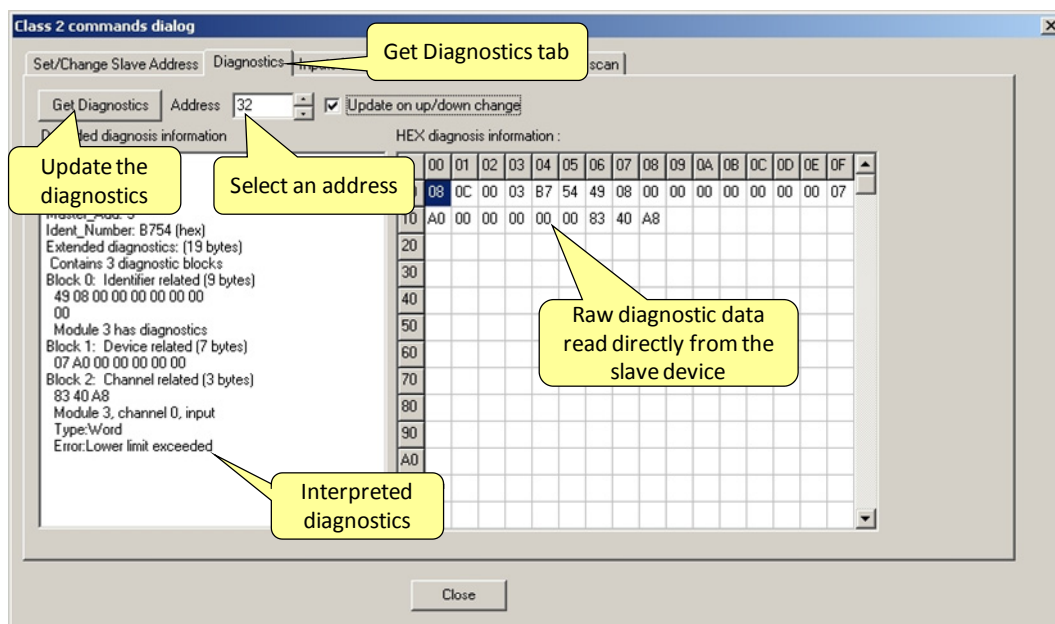
With the class 2 Get Configuration function, ProfiCaptain reads the configuration from a slave device.



Select an address and click on “**Get Configuration**” to update the configuration data.

9.2.5 Get Diagnostics

With the class 2 Get Diagnostics function, ProfiCaptain reads out the last update of the diagnostic information from a slave device. ProfiCaptain will try to decode the diagnostic information by means of the GSD file information or the scheme of the standard.



Select an address and click on “**Get Diagnostics**” to update the diagnostic data.

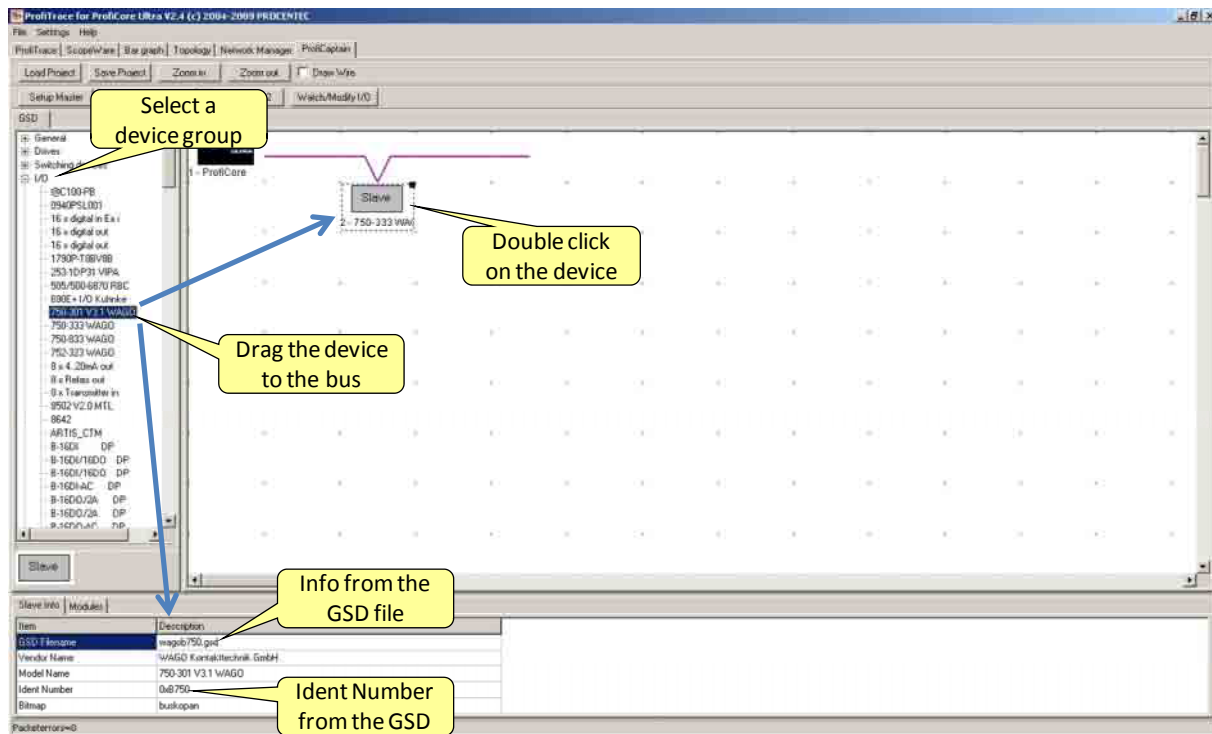
9.3 Configuring slave devices

The first thing that should be done before configuring slave devices is to update the catalog (see 3.10). When the catalog is up to date with the required GSD files, the configuration procedure can start.

9.3.1 Adding devices

You can easily drag a GSD file from the catalog to the bus. It is not required to connect the slave device with the virtual bus. The device can also “float” somewhere in the configuration screen. To make it visually more attractive the user can increase the length of the virtual bus by ticking “draw wire”.

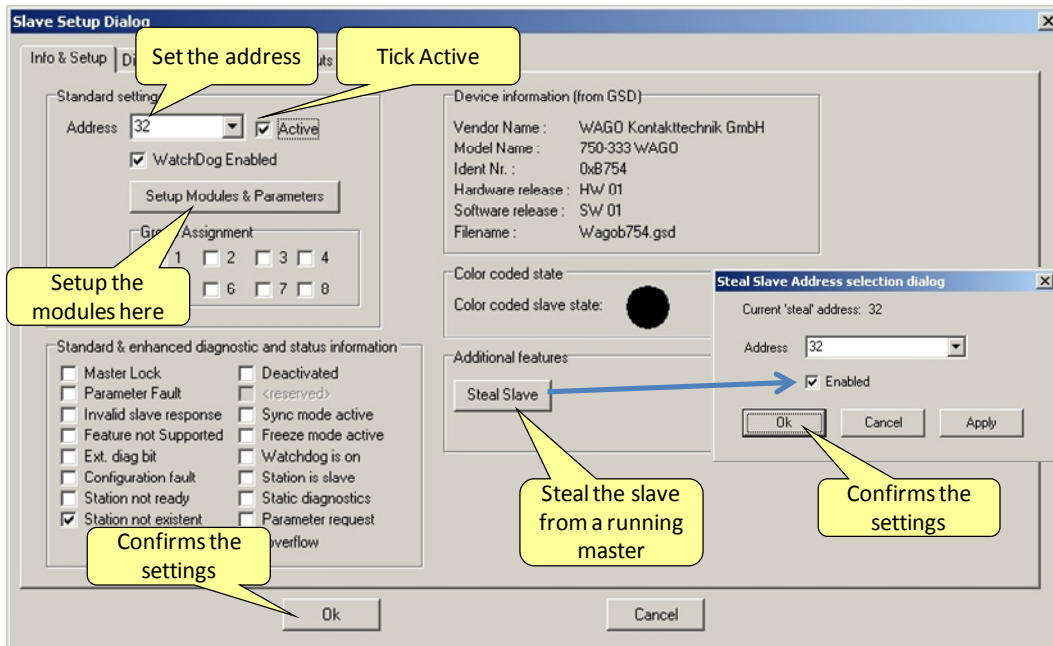
When a slave device has to be deleted, just right-mouse-click on the slave device and select delete.



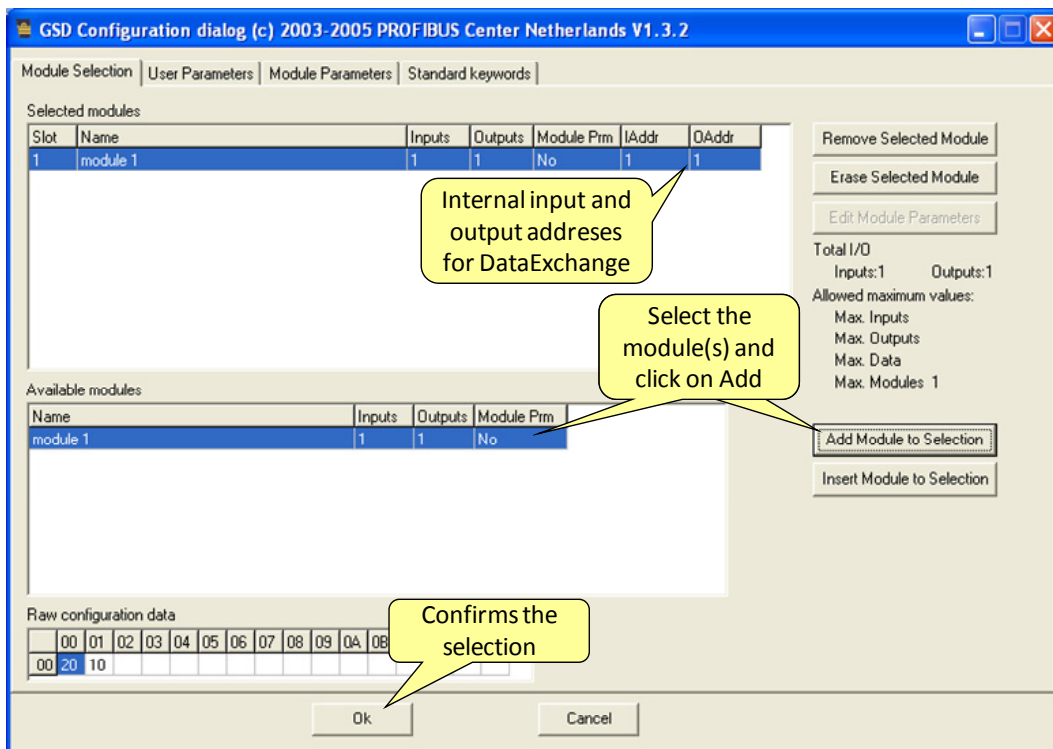
After dragging the slave device to the bus, double click on the slave device to setup the address, modules and parameters.



When the user is not sure if he has selected the correct GSD file, he can compare the Ident Number from the slave info field with the info that was extracted during the network scan with the class 2 functions (see 9.2.1)



Select the address followed by “**Setup the Modules & Parameters**”.

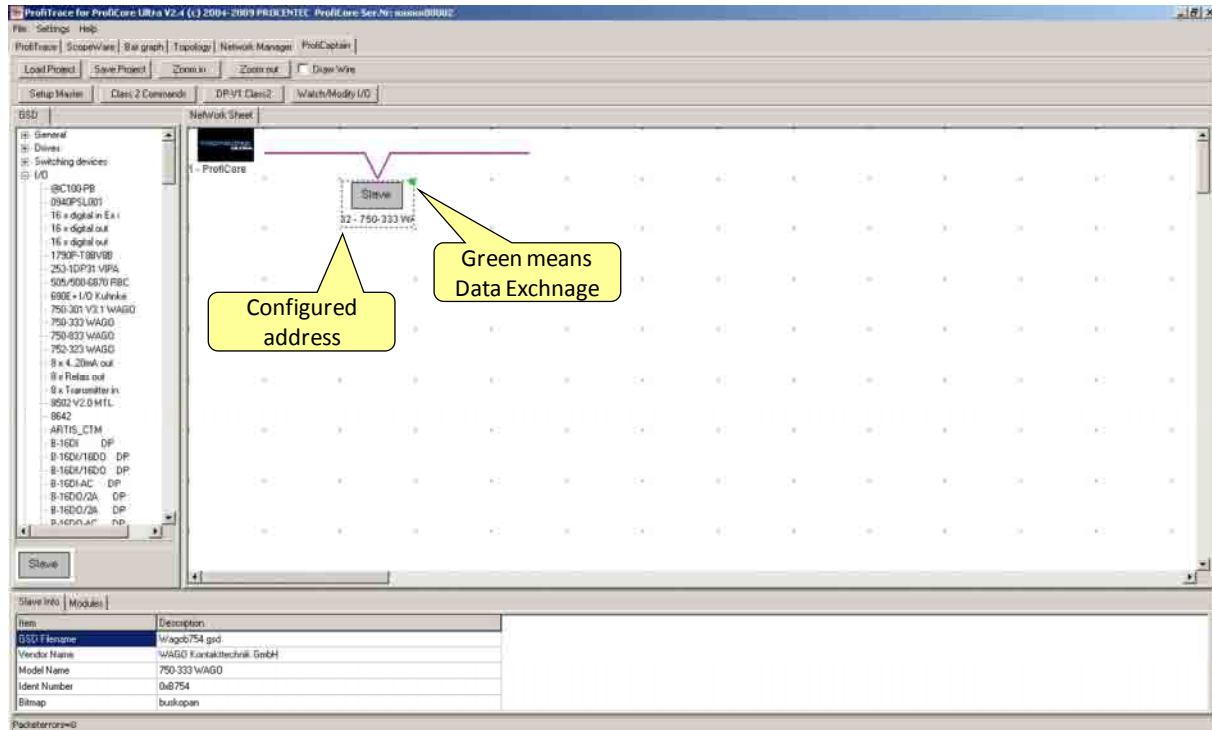


Select the required modules and setup the parameters. Click “**OK**” to confirm.

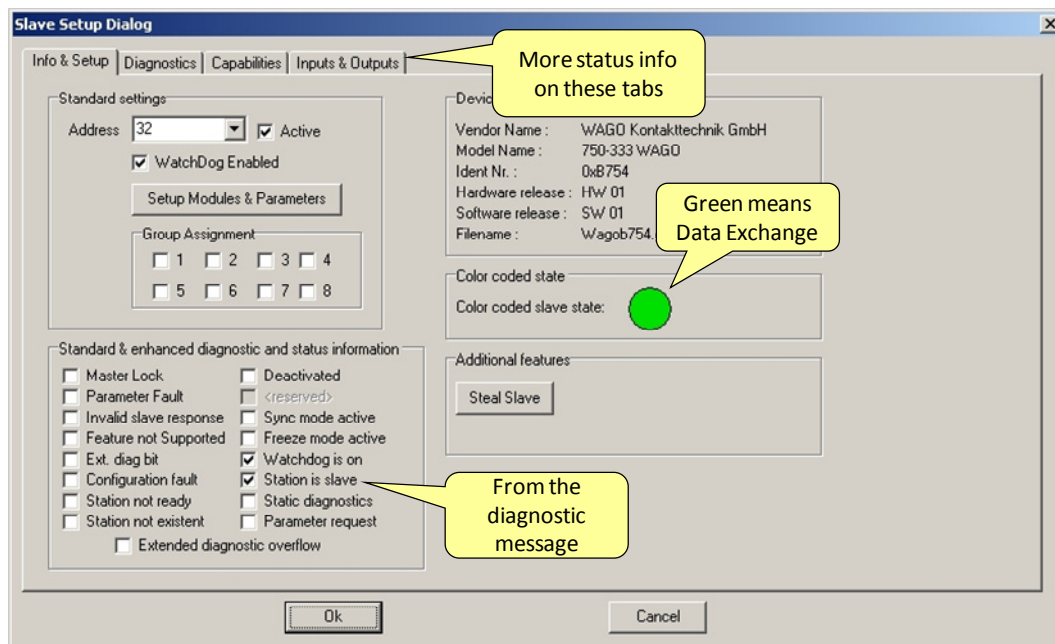
When back in the previous screen; Tick active to enable ProfiCaptain to have Data Exchange with this slave device. If slave is already occupied by another master, ProfiCaptain can take over the device by clicking on “**Steal Slave**”. Click “**OK**” to confirm.

9.3.2 Status of the device

If the device is setup correctly, the indicator on the top right should now turn green (Data Exchange).



Double click on the device to check the status of the device.



On the tabs on the top more status info from the device can be inspected.



If the device has another colour, something went wrong with the Data Exchange procedure. The colour coding is the same as the Live List from ProfiTrace (red and purple) – See 5.3.1. Black indicates the device cannot be found on the bus, the master is not active or the device has been disabled.

9.3.3 Info on Stealing slaves

ProfiCaptain has a unique feature which allows it to steal a slave from its controlling master without having to interact with the controlling master in any way. It could be that the device from the previous paragraphs has been stolen from another master.

This method relies on “jamming” the original master’s Data Exchange telegram with a short transmission from ProfiCaptain at exactly the correct time.

ProfiCaptain then temporarily poses as the original master (by using its address as the source) and unlocks the slave. ProfiCaptain then is free to capture the slave with the normal start-up sequence.

Should the Steal Slave be disabled and deactivated in ProfiCaptain, the original master will then regain control again.

9.4 Exchanging I/O data

When the slaves devices are in the Data Exchange it is now possible to exchange data with the I/O. Select the specific slave device and click on module info at the bottom of the screen (all the I/O addresses should be visible).

Click on the “**Watch/Modify I/O**” tab.

1. Select the slave device

2. Click here

3. Click here

Add variables

Automatic patterns for outputs

Provide an output value and press enter

Address	I/O	Datatype	Visualisation	Content	Modify to	Auto-change	Enabled
0	Input	Unsigned8 (byte)	Decimal	0		No change	Enabled
1	Input	Unsigned8 (byte)	Decimal	0		No change	Enabled
2	Input	Unsigned16	Decimal	1088		No change	Enabled
0	Output	Unsigned8 (byte)	Decimal	59		Increase	Enabled
1	Output	Unsigned8 (byte)	Decimal	64	64	No change	Enabled

Add the required input and output addresses. From this point they can be directly manipulated and inspected. Especially the automatic patterns are a very powerful feature.

9.4.1 Data types

The following input and output data types are possible that can be display as decimal, hex or binary:

Data type	Range
Boolean	1 or 0
Unsigned8 (byte)	8 bit unsigned integer (byte) Range: 0..255
Unsigned16	16 bit unsigned integer Range: 0..65535
Unsigned32	32 bit unsigned integer Range: 0..4294967295
Int8	8 bit signed integer Range: -128..+127
Int16	16 bit signed integer Range: -32768..32767
Int32	32 bit signed integer Range:-2147483648..2147483647
Float (IEEE754)	32 bit single precision floating point Range: 1.5E45..3.4E38
Unsigned16_intel	As Unsigned16, but reversed in high-byte/low-byte order in memory
Unsigned32_intel	As Unsigned16, but reversed in high-byte/low-byte order in memory
Int16_intel	As Int16, but reversed in high-byte/low-byte order in memory
Int32_intel	As Int32, but reversed in high-byte/low-byte order in memory

9.4.2 Visualization types

Visualization type	Entry
Decimal	100 1.5 (only for float) 1e5 (only for float / becomes 100000)
Binary	b1010 1100 b11001100 b1000 (becomes 16 decimal)
Hexadecimal	0xe75a 0x78FE 0x1111

9.4.3 Automatic patterns

ProfiCaptain offers 5 automatic patterns;

Increase

Automatically increase by arg1 every X milliseconds (approx.) at the given cycle time

Decrease

Automatically increase by arg1 every X milliseconds (approx.) at the given cycle time

Bit Zig-Zag

Will move a single bit to the left and when the left is reached it will move to the right and back again.
Only for Unsigned datatypes.

Bit Walk

Will move a single bit from a low to high. If it has reached the highest bit it will restart on bit 0.

Copy from input

Copies a specified input address directly to an output.

10 OPC server

The ProfiTrace OPC Server offers a standardized interface to get the valuable ProfiTrace information, like device status, statistics and process variables into applications that carry an OPC client, like: SCADA, Excel, etc.

Many process or factory plants nowadays use SCADA or Asset management software to get an overview of the production status and application alarms. However, they have no insight on the PROFIBUS health and behaviour which could indicate a potential shutdown. This information contributes heavily to the installation uptime.

Using ProfiTrace OPC, it is now possible to get the real live state of your PROFIBUS network directly in your SCADA system, allowing maintenance engineers and operators to react quickly to any PROFIBUS related alarms or irregular events coming up on the screen. The opportunities are vast and we are just discovering the possibilities what it could contribute to your asset management. You can display ProfiTrace tags in a SCADA/HMI package or link it to an SMS/email client and send a message when something happens with the PROFIBUS installation or even generate your own report in MS Word/Excel. Every application that acts as OPC client can approach the ProfiTrace tags. It does NOT corrupt the PROFIBUS cycle time because the information comes from busmonitoring (listening).

10.1 Installing the OPC drivers

The PC that runs ProfiTrace has to be prepared for OPC by installing the drivers (see Fig. 44).



The installation process of the OPC drivers takes a relatively long time.

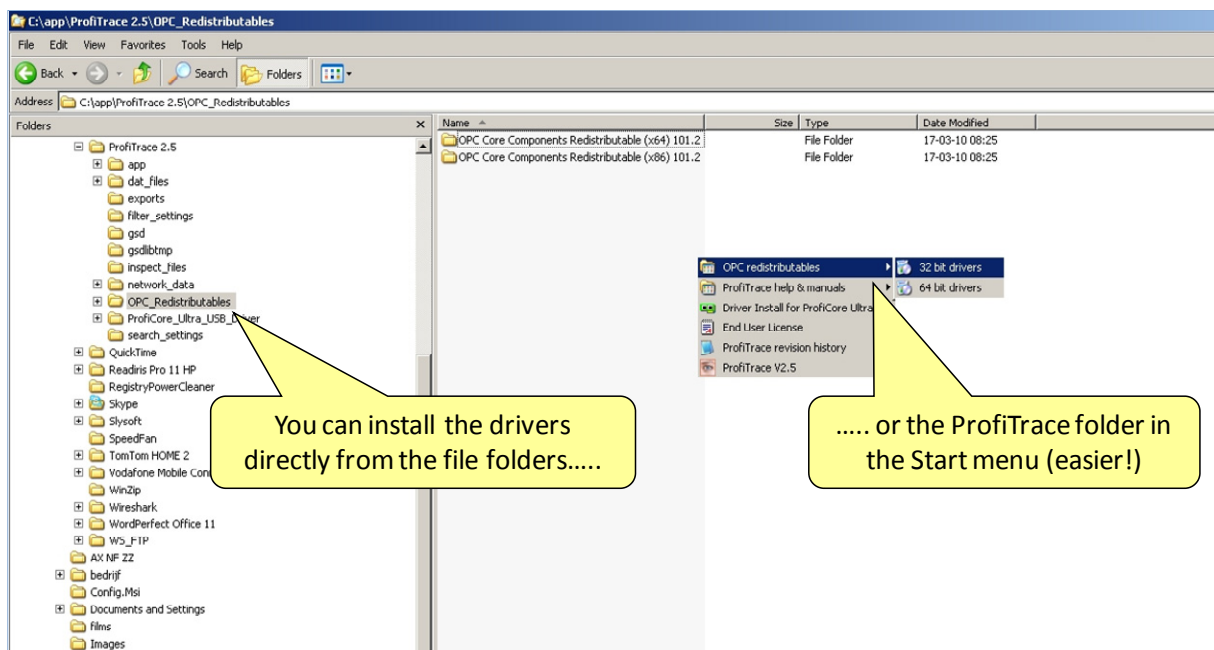


Fig. 44 - Location of the OPC drivers

10.2 Selecting OPC tags

The OPC tag settings can be found in the Settings menu (see **Fig. 45**).

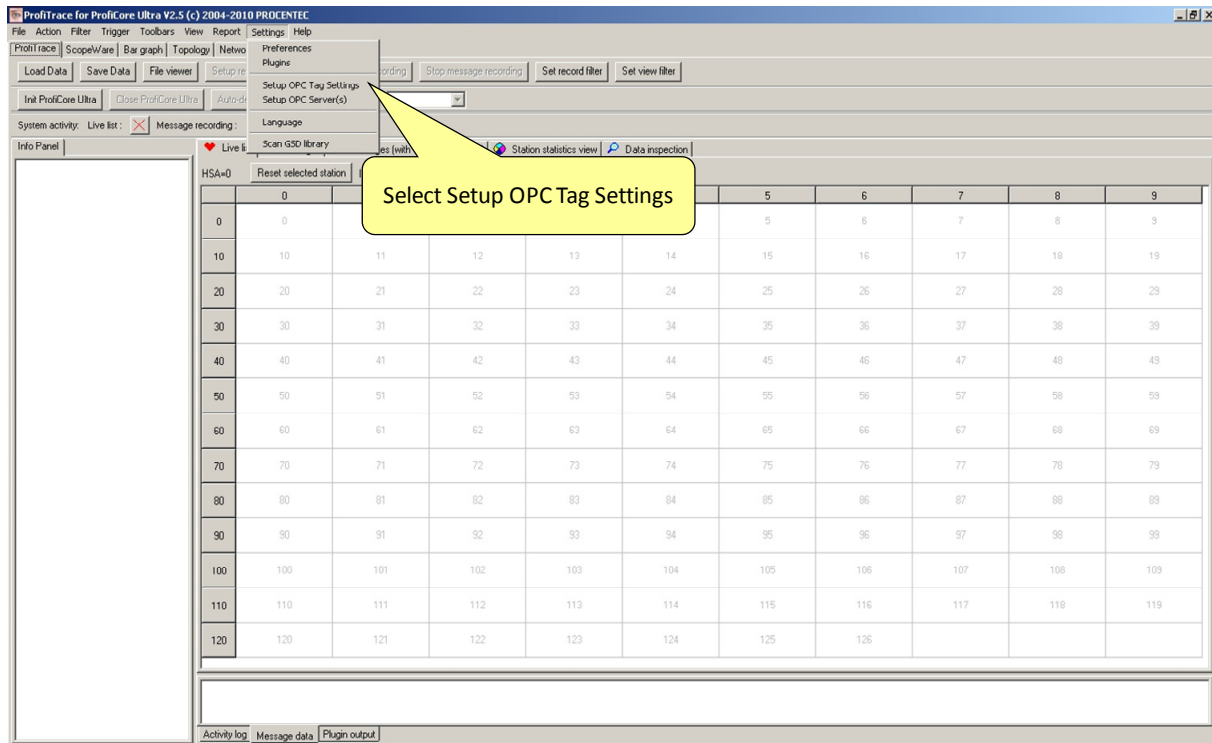


Fig. 45 - OPC tags in the Settings menu

In the next dialog you can add tags (see **Fig. 46**). All basic tags are already available (Live List, and Statistics). When you do not require additional tags, you do not have to enter this dialog and can you directly proceed to the server settings.

The OPC tags are locations in the I/O data of the devices (offset 0 is the first location).



Be careful with too many tags. The quantity of tags can slow down your system, especially when you want to run multiple applications at the same time. To solve this you can filter tags in the client you are using.

You can save your date in a .PTO file which is used later during the setup of the OPC server.

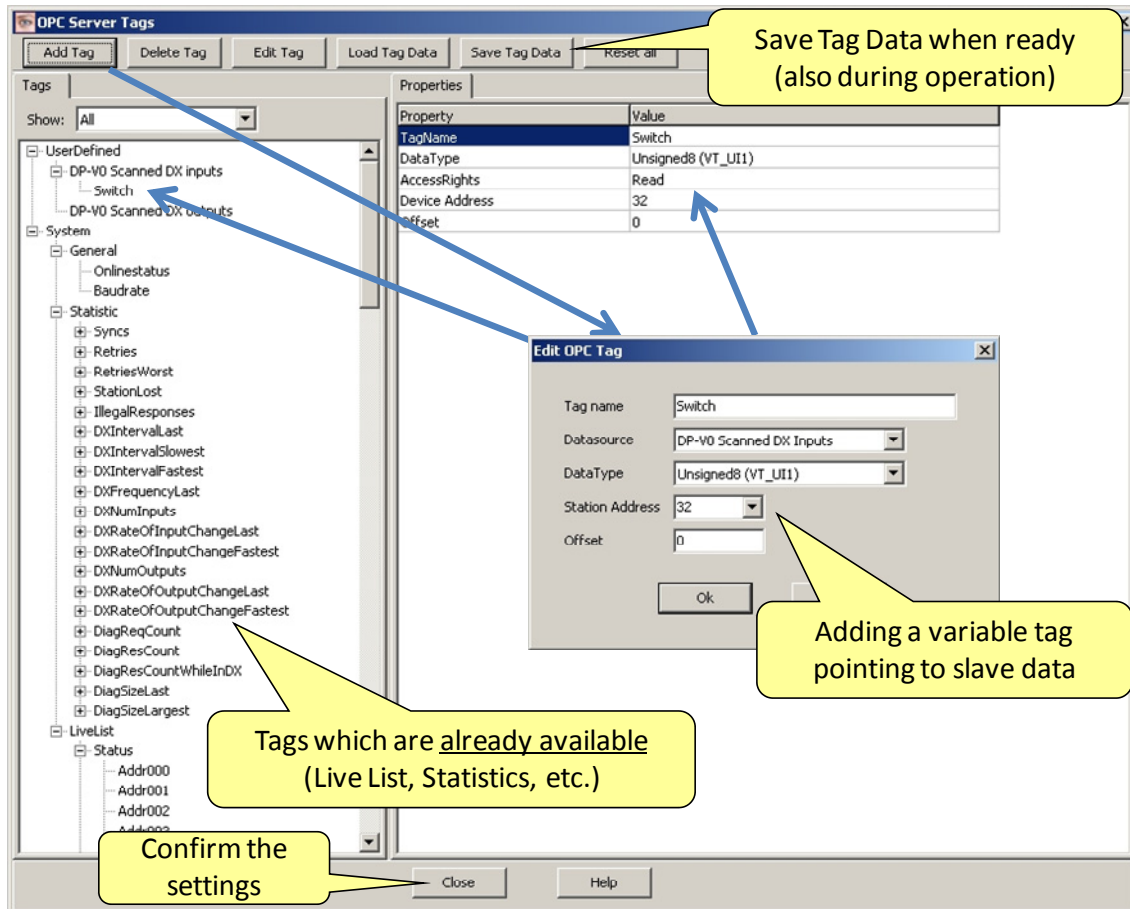


Fig. 46 - Adding OPC tags

10.3 Activating the OPC server

After setting up the OPC tags, the server has to be activated.

The OPC server settings can be found in the Settings menu (see **Fig. 48**).

In the next dialog the server can be added (see **Fig. 47**).



Maximum 16 servers can be created each with its own tag groups.

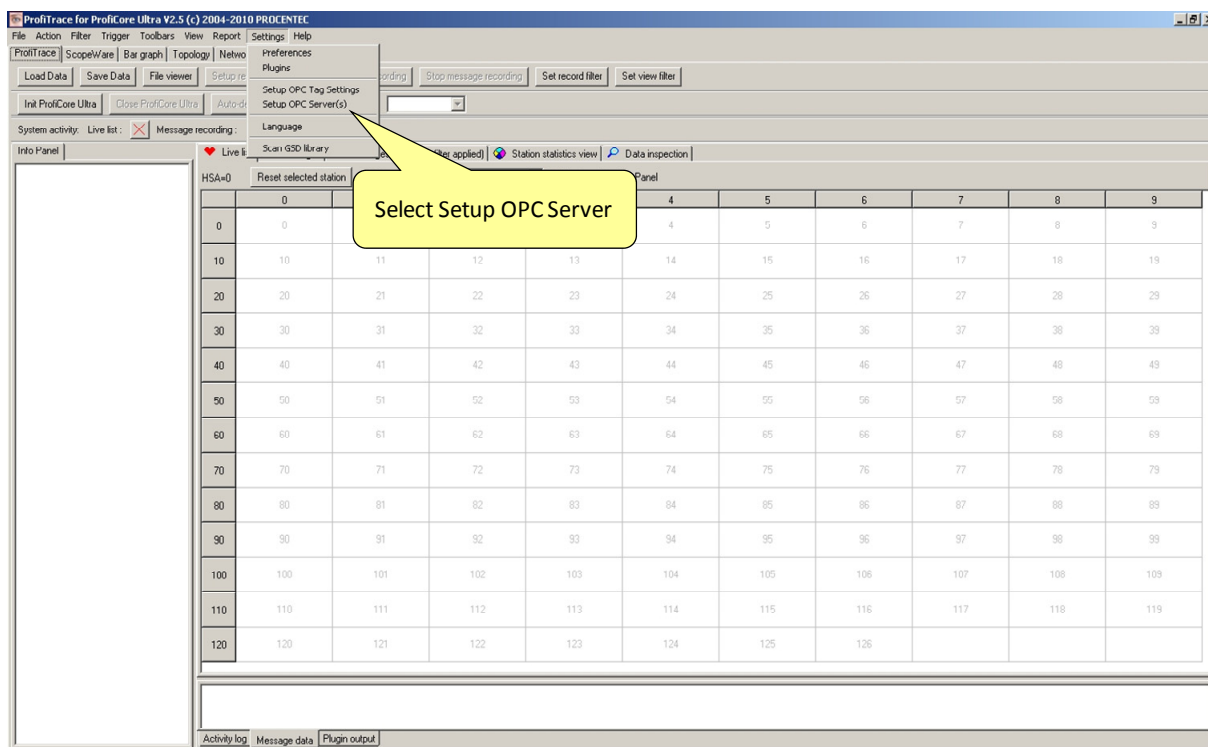


Fig. 48 - OPC server in the Settings menu

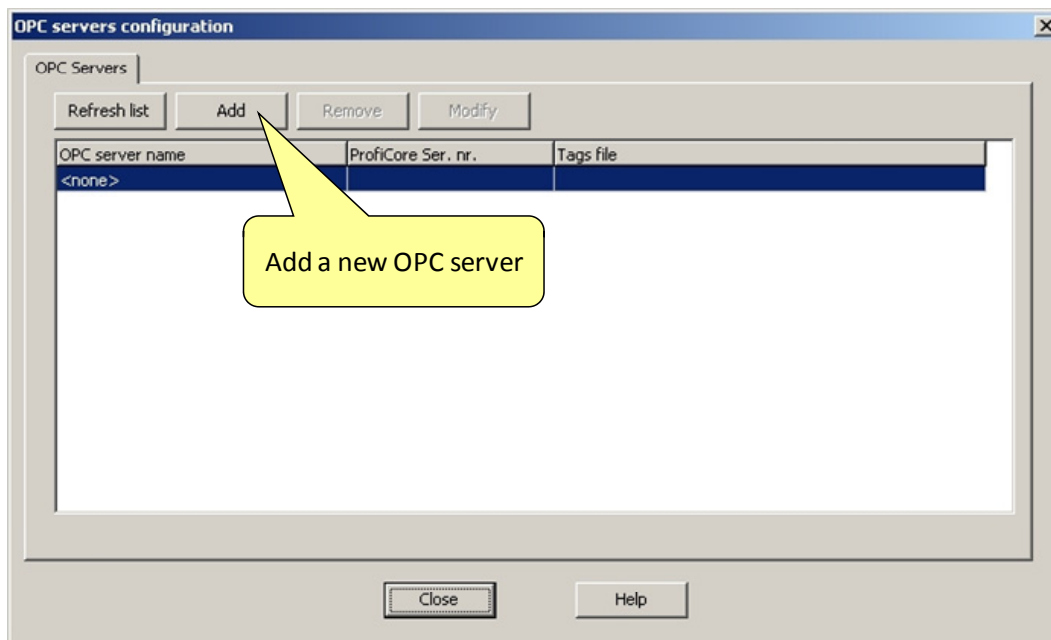


Fig. 47 - Adding the OPC server

In the next dialog the properties of the server are set up (see **Fig. 49**).

Give it a proper name and indicate if you want to use the default tags or the .PTO file with the user defined tags.

It is also possible to link the OPC server to a certain ProfiCore. By default it is set to all.

When the settings are completed click “close” and the OPC server will be active. In later stages the OPC server settings can be modified.

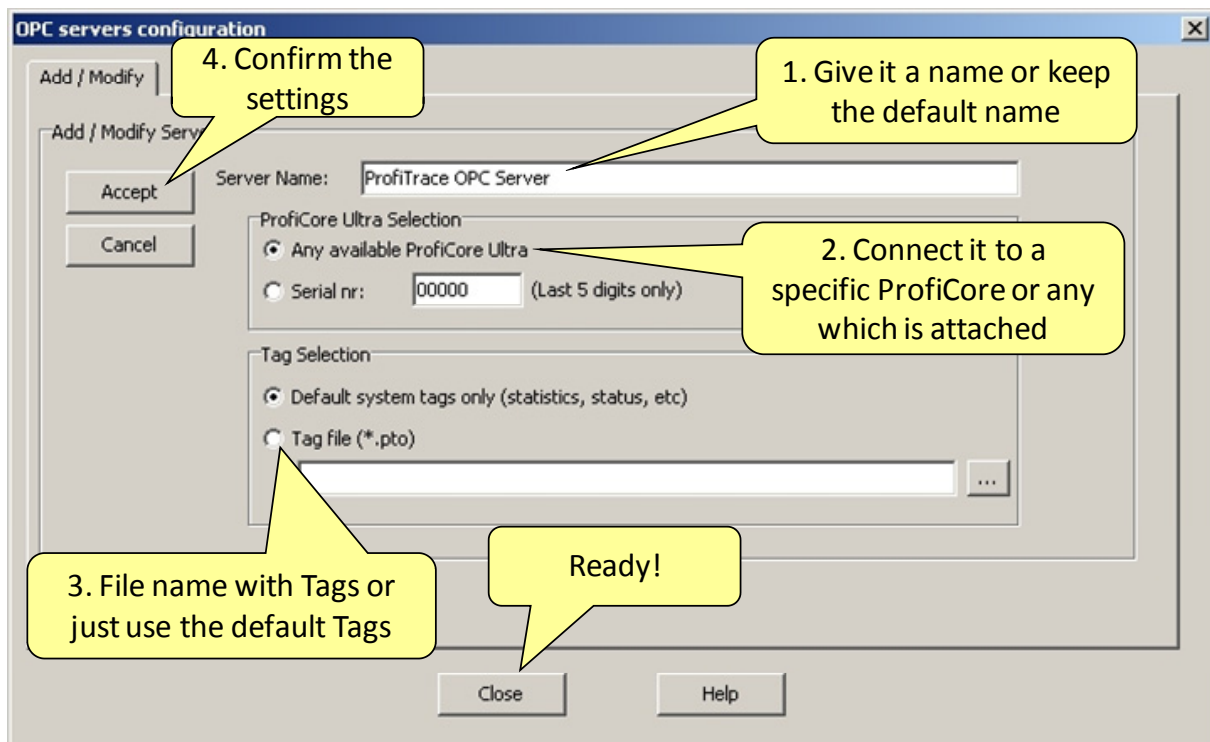


Fig. 49 - OPC server properties

From this point any application that has the availability of an OPC client can access the ProfiTrace OPC tags.

11 Training

This chapter contains some exercises to enhance the practical knowledge of ProfiTrace 2. In order to do these exercises it is required to connect ProfiTrace to a working installation with a master that has at least 2 slaves in Data Exchange.

Recommended busparameters:

- 1,5 Mbps
- HSA = 126
- Retries = 5

11.1 First steps

Assignment 1 Software installation

- ☐ Install the ProfiTrace software on the PC/Laptop.
- ☐ Copy/Install the required license file in the \APP directory.
- ☐ Copy the required GSD files to the GSD directory of ProfiTrace.
- ☐ Connect the ProfiCore Ultra to the PC/Laptop.
- ☐ Test the installation by starting the software and click on "Init ProfiCore".

When the software is running, the Live List of the PROFIBUS Installation should be visible.

- ☐ Select the preferred language.
- ☐ Scan the GSD files in ProfiTrace.
- ☐ Generate the catalogue in ProfiCaptain.
- ☐ Check the Live List by switching the PLC ON/OFF (if device names are missing, locate the GSD files).
- ☐ Close ProfiTrace when this assignment is ready!!!!!!

Assignment 2 Drawing of the installation

- ☐ Create a technical drawing of the PROFIBUS installation (finish it within 15 minutes).

Instructions:

- Indicate clearly the location of the devices with its name and if it is a master or slave.
- Indicate the network addresses by looking at the dip switches or rotary switches.
- Indicate how the cable is going in and out the connectors.
- Indicate the location of the termination.
- Do not remove cable tray covers or open connectors.

Assignment 3 Assessment of the connected devices

- ☐ Start and initialise ProfiTrace.
- ☐ What is the detected baudrate? _____
- ☐ How many masters and/or slaves does this installation have? _____
- ☐ What is the value of the HSA? _____
- ☐ Does the Live List correspond with your drawing? _____
- ☐ Scan the GSD library and switch the PLC (master) OFF/ON. Wait until the complete installation has restarted.
- ☐ Does the Live List correspond with your drawing? _____
- ☐ Adjust the detected differences in your drawing.

11.2 ProfiTrace Live List

Assignment 1 Interpretation of the Live List colours

Fix each fault after a specific step.

- ☐ Switch a slave OFF or remove the bus connector and investigate the Live List.
- ☐ Change the network address of a slave and investigate the Live List (don't forget to switch the slave OFF/ON).
- ☐ Swap the addresses of 2 slaves and investigate the Live List.
- ☐ Create a situation in which the configuration of a slave is different than that of the master. With some slaves you can just remove an I/O card. Investigate the Live List.
- ☐ Generate a diagnostic event (I/O problem, I/O card removal, etc) and investigate the Live List. If the device is blinking, click on it and investigate the info panel.
- ☐ Fix all faults after this assignment!

11.3 ProfiTrace Statistics

Assignment 1 Syncs, Station Lost and Retries

When a slave is NOT available and ProfiTrace is started afterwards, you can't see it in the Live List. For these situations the Statistics are a very important feature to check which devices are missing.

- ☐ Switch a slave OFF or remove the bus connector and investigate the Live List.
- ☐ Restart ProfiTrace and check the Live List.
- ☐ Open the statistics view.
- ☐ Go to the field "Syncs" and analyse the values.
- ☐ Switch ON the slave and analyse the field "Syncs" again. Repeat this with some other slaves.

The Syncs will show you how many cycles the slaves were not available for the master. You can also check how many times the slaves were not available.

- ☐ Go to the field "Station Lost" and analyse the values.
- ☐ Fix all faults! Check if the "Syncs" have stopped.
- ☐ Click on "Reset All" to clean up all the statistics.
- ☐ Go to the field "Retries (total for this station)", switch OFF a slave and analyse the values.
- ☐ Fix all faults! Check if the "Syncs" have stopped.

Assignment 2 Double address

The Statistics can easily indicate a double address.

- ☐ Generate a double address and check it in the Live List and the "Syncs" in the "Statistics".
- ☐ Go to the field "Illegal responses to requests" and investigate what happens (on some masters this might not work).
- ☐ Fix all faults! Check if the "Syncs" and the "Illegal responses to requests" have stopped.

Assignment 3 Cycle time

- ☐ Click on “Reset All” to clean up all the statistics.
 - ☐ Go to the field “Data Exchange Interval (msec)”.
What is the cycle time of the installation? _____
 - ☐ Switch a slave OFF or remove 80% of the devices.
 - ☐ What is the cycle time of the installation? _____
 - ☐ Fix all faults! Check if the “Syncs” have stopped.
-

Assignment 4 Diagnostics

- ☐ Click on “Reset All” to clean up all the statistics.
- ☐ Go to the field “Diagnostic msg res from slave when in DX”.
- ☐ Generate diagnostic events (I/O problem, I/O card removal, etc) and investigate this statistic.
- ☐ Click on an address of this statistic that has a value and check the info panel.
- ☐ Fix all faults! Check if the “Syncs” have stopped and that the Live List does not indicate diagnostics.

11.4 Recording messages

Assignment 1 Starting a message trace

- ☐ Make sure the installation works properly (No Syncs, Retries, etc.).
- ☐ Click on “Messages” (should be an empty screen).
- ☐ Click on “Start message recording”.

The screen should now be filling up with messages and on the bottom you should see an indication how full the message buffer is.

- ☐ Click on “Stop message recording” to stop the recording.
- ☐ Investigate what you see (Timestamp, Frame, Addr, Service, MSG type, SAP, Datalen, Data).

Assignment 2 Search function

- ☐ Click again on “Start Message Recording”.
- ☐ Switch a slave OFF.
- ☐ Click on “Stop message recording”.
- ☐ Click on “Setup Search”.
- ☐ Search for “Repeated messages” and click OK.
- ☐ Click on “Search Down”.
- ☐ You should have detected the moment of lost.
- ☐ Fix all faults! Check if the “Syncs” have stopped.

Assignment 3 Trigger function (on retries)

In case of sporadic disturbances it is important to use the trigger function. In this assignment a trigger on retry messages has to be set.

- ☐ Click on “Messages”.
- ☐ Click on “Trigger” followed by “Setup message record trigger”.
- ☐ Set: Enable, Retrigger, 10 Messages before, 10 Messages after (do not limit = off).
- ☐ Click on “Setup trigger” and select “repeated message”.
- ☐ Click on “Start Message Recording” (should be an empty screen).
- ☐ Switch a slave OFF (screen should be filling with 20+ messages).
- ☐ Investigate what you see.
- ☐ Fix all faults! Check if the “Syncs” have stopped.

11.5 Data inspection

Assignment 1 Introduction

- ☐ Display the data of a couple of devices.

11.6 Oscilloscope

Assignment 1 Introduction

- ☐ Click on ScopeWare and check if the oscilloscope runs.
 - ☐ Trigger on each device (including the master(s) by clicking twice on the Live List. At the same time select an appropriate time base in which the end of the master message is seen as well.
-

Assignment 2 Powered termination

- ☐ Inspect the Voltage level during the quiet time between 2 messages.
Voltage level? _____
 - ☐ Remove the power from one of the termination and inspect the Voltage level during the quiet time between 2 messages. Voltage level? _____
 - ☐ If possible, also remove the power of the 2nd termination and inspect the Voltage level during the quiet time between 2 messages. Voltage level? _____
 - ☐ Fix all faults!
-

Assignment 3 Termination missing

- ☐ Remove a termination.
 - ☐ Try to find the distance to the problem by triggering on the last 2 devices on the segment.
 - ☐ Fix all faults!
-

Assignment 4 Short circuit

- ☐ Create a short circuit between A and B at the end of the cable.

- ☐ Try to find the distance to the problem by triggering on the last 2 devices on the segment.
- ☐ Fix all faults!

11.7 Bar graph

Assignment 1 Regular situation

- ☐ Make sure the installation works properly without physical problems.
 - ☐ Analyse the AB differential and AB Diff Stable Voltage. Are they the same?
 - ☐ Insert extra cable between the last 2 devices. Analyse a difference in the Bar graph.
 - ☐ Sort the signals on high-to-low Voltage and compare this with the drawings of the installation.
-

Assignment 2 Termination missing

- ☐ Remove a termination and investigate the AB differential and AB Diff Stable Voltage.
-

Assignment 3 Short circuit

- ☐ Create a short circuit between A and B and investigate the AB differential and AB Diff Stable Voltage.

11.8 Report generation

Assignment 1 Installation with faults

- ☐ Generate a report of an installation with faults and investigate the results (including your company logo).
-

Assignment 2 Installation without faults

- ☐ Generate a report of an installation without faults and investigate the results (including your company logo).

12 Tips and tricks

This chapter contains some tips and tricks to make working with ProfiTrace a lot easier.

12.1 Checklist to prepare your installation

The following items can be implemented in and around your installation to simplify PROFIBUS troubleshooting.

- ☐ At least 1 piggy back plug on every segment (start of the cable)
- ☐ Every segment has its own addressing range (10..19, 20..29, etc)
- ☐ Individual repeaters/OLMs can be powered up/down
- ☐ Individual devices can be powered up/down
- ☐ PLC/DCS at the beginning of the cable
- ☐ Diagnostics is enabled in the devices
- ☐ Installation drawing on 1 or 2 pages (with cable lengths and addresses)
- ☐ Addresses clearly marked on the devices
- ☐ All GSD files are available in ProfiTrace
- ☐ Access to the PLC/DCS configuration

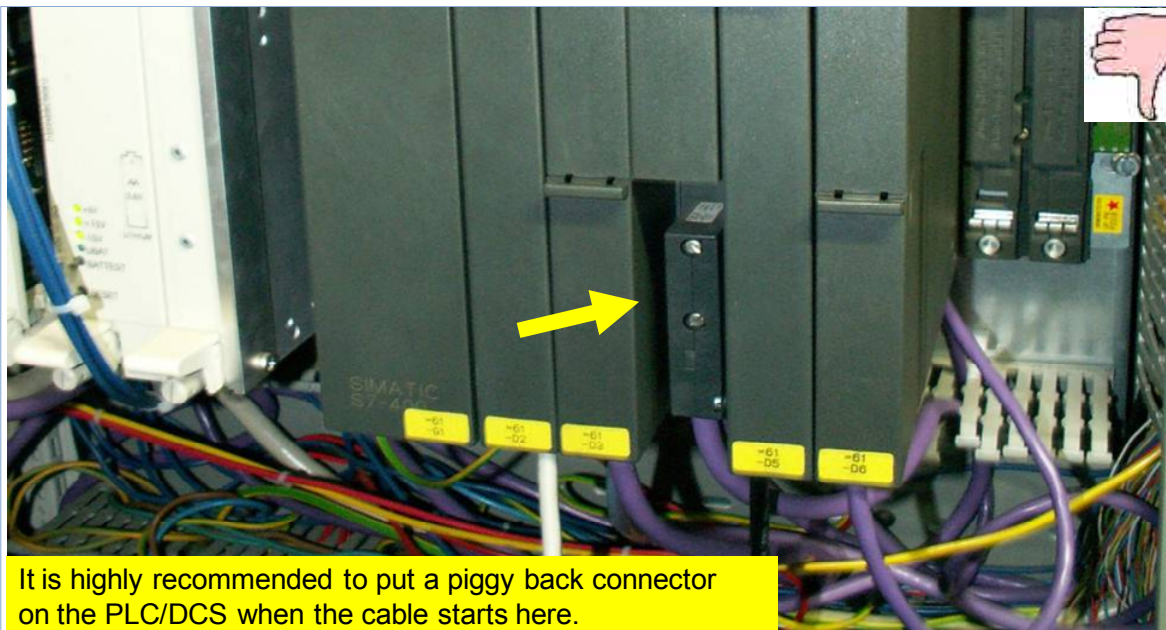


Fig. 50 - Segment without piggy back plugs

12.2 Checklist to create a reliable installation

The following items can be implemented in and around your installation to make it more reliable.

- | | |
|--|-----------------------------|
| <input type="checkbox"/> Repeater backbones with repeaters/ProfiHubs | (isolation of problems) |
| <input type="checkbox"/> External powered termination | (removing/adding devices) |
| <input type="checkbox"/> Reduce the baudrate | (improves signal quality) |
| <input type="checkbox"/> Increase the repeats/retries | (increases success rate) |
| <input type="checkbox"/> Reduce the spur/stub lines or use repeaters/ProfiHubs | (improves signal quality) |
| <input type="checkbox"/> Cable as close as possible to ground | (decreases EMC sensitivity) |
| <input type="checkbox"/> Additional grounding points | (decreases EMC sensitivity) |
| <input type="checkbox"/> Activate the watchdog on all devices | (safety) |
| <input type="checkbox"/> Use fibre optic for long distances | (isolation of problems) |

12.3 ProfiTrace and ProfiCaptain secrets

Open a GSD file directly from the Live List

When in the Live List the product name is visible, you can right-click on the device and select “Show related GSD file for station address x”. Make sure Windows knows which editor to open for GSD/E/G/etc extensions.

See the frames in raw format

Click on “RAW” to toggle from decoded frames to raw frames.

Change the units from meter to feet and vice-versa

Click on “Settings” followed by “Preferences” followed by “ScopeWare/Topology” and select meter or feet.

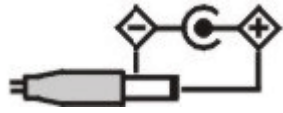
To reset all statistics and report logging without shutting down the ProfiCore

Click on “File” followed by “New”.

In ProfiCaptain the device does not need to be connected to the virtual bus cable.

Every device which is placed in the configuration area will be approached for Data Exchange.

13 Technical data ProfiCore Ultra

Technical data ProfiCore Ultra	
Dimensions and weight	
Dimensions L x W x H (mm) with DB9 Weight	108 x 68 x 28 mm Approximately 125 g
Ambient conditions	
Operating temperature Storage temperature Isolation class	0 to +60° Celsius -20 to +70° Celsius IP 20 (DIN 40 050)
Power supply specifications	
USB current consumption (without adapter)	400 mA
Adapter Voltage Adapter current consumption	9 V 400 mA
Connector descriptions	
DB9 (female) – PROFIBUS	Pin 3: B-line Pin 8: A-line Pin 6: VP Pin 5: DGND Case: Ground/Shield
Expansion connector	Pin 1: 3,3 V output power Pin 4: Trigger GND Pin 5: Trigger Pin 8: Power GND
Power connector	Opening: 6,0 mm Center pin: 1,95 mm Plug according to: NES/J 21, NES/J 21 W, NES/J 210 XNES/J 210 

Technical data ProfiCore Ultra	
Oscilloscope specifications	
Frequency	2 x 192 MHz (A-line and B-line) 384 MHz (Differential measurement)
Bandwidth	100 MHz
Voltage	Differential: -9 to +9 V Single ended: -4,5 to +8,5 V (with the PA Probe ultra these values are different)

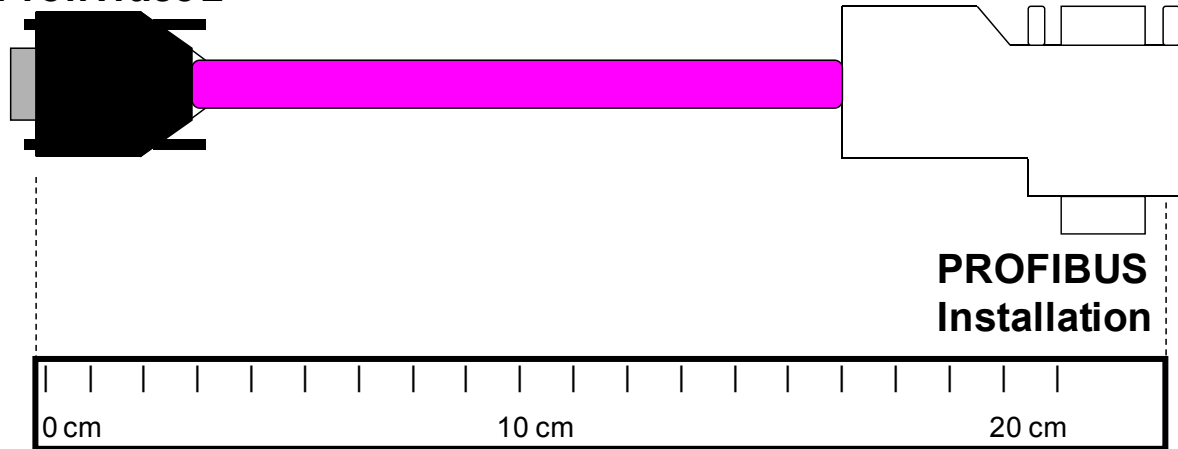
14 Technical data PA Probe Ultra

Technical data PA Probe Ultra	
Dimensions and weight	
Dimensions L x W x H (mm) Weight	76 x 33 x 12 mm Approximately 25 g
Ambient conditions	
Operating temperature Isolation class	0 to +70° Celsius IP 20 (DIN 40 050)
Connector descriptions	
PROFIBUS PA Connector	Pin 1: Shield Pin 2: PA- Pin 3: PA+
PA specifications	
Voltage	DC: 0..33 V AC: 1,2 Vtt
Input resistance Input capacitance	> 600 kOhm < 1 nF
ProfiTrace version	Works with ProfiTrace V2.2.1 and higher

15 Technical data Tap Connector

The Tap Connector is a small cable to connect the ProfiCore to a PROFIBUS DP network. It has been designed NOT to cause network disturbances due to spur lines. A perfect vertical position for the ProfiCore is obtained that does not overpressure the piggy back plug which is attached to the DP network. The cable is of the flexible type so you can move it to all directions.

ProfiTrace 2



Please check if the termination resistor on the Tap Connector is OFF! In regular situations the termination on the Tap Connector is NOT required.

16 Hotkeys

General

F1 Help.

Messages

F2 Toggle between RAW frames and decoded frames.
F3 Switch the Timestamp column between Tbit, sec, ms, us, date and time.
F4 Switch the Idle Time and Deltatime column between Tbit, sec, ms, us, date and time.
F5 Toggle between Hex data and Decimal data.
F6 Toggle between normal view and filtered view.

17 Frequently asked questions

I'm looking for a document that describes what is a bad and good signal?

The ProfiTrace 2 manual contains all kinds of example measurements (wire breaks, short circuits, stub lines, etc) that can be compared with the real situation. Please download it from our website.

For generating a PDF file of the report, can you advice a freeware PDF creator?

For creating PDF files you can use the freeware tool PDFill. You can download it at: www.pdfill.com

When I order ProfiTrace without the ScopeWare, Topology scan and Bar graph, can I buy these modules later?

YES, licenses for every single software option can be purchased at any time.

Can I get a trigger signal for an external oscilloscope from Proficore Ultra?

YES, ProfiCore Ultra still allows you to connect an external oscilloscope. But, we prefer you to use the ScopeWare which makes electrical measurements much easier.

Sometimes ProfiTrace cannot detect the baudrate. When I set it to manual, it works. What is the solution to solve this problem?

Sometimes the combination PC, ProfiCore and PROFIBUS can make it difficult for the software to detect the baudrate. This has to do with a certain timeout. This timeout can be set in: *Settings->Preferences->General*. Here you find the timeout for the baudrate detection. Set it to a higher value and in most cases this will solve the problem.

What happens if you switch on the termination of the Tapconnector?

You will have 3 terminators in the segment and that could cause data communication problems. The reason we have it, is if you do not have termination or if you are experimenting with cabling, you have an alternative available.

Operating systems, drivers and installation

Topology scan hangs in a Window 7 environment. How can I solve this?

Select Windows XP in the compatibility properties of ProfiTrace.

Can I install ProfiTrace 2 next to ProfiTrace 1?

YES, it uses another default installation directory and the drivers are different. You can even run both applications at the same time.

Can I run ProfiTrace 2 on a Windows 2000 system?

This depends on 2 factors; the performance and the system has to be equipped with high speed USB 2.0 ports.

Can I run ProfiTrace 2 on a Windows Vista system?

It might be necessary to run in Windows XP Compatibility mode. You can set this in the properties of the exe file.

Can I run ProfiTrace 2 on a Windows7 system?

Yes, version 2.4 and later provides drivers to run ProfiTrace on Windows7 systems.

Hardware requirements

Can ProfiCore Ultra overload the bus when it is attached to a running installation?

ProfiCore Ultra is designed and produced around the latest RS 485 technology (1/5 of a standard bus load). This means the load of ProfiCore Ultra can be ignored on a full bus segment. Spur cables are also no problem, because the USB cable is the path to the PC (5 meters). ProfiCore Ultra can be connected very close to the network and the PC can be on a distance from the tap point.

The ProfiCore Ultra has an RS 485 interface for the DP bus. Is it possible to analyze a PA segment?

YES, if you want to use the ProfiCore Ultra on a PA bus, attach the PA probe to the ProfiCore Ultra. The PA probe transforms the extracted signals from the PA bus to information which is fed into the ProfiCore Ultra.



Which USB version is supported?

High speed USB 2.0 is supported by ProfiTrace 2.

I have a CP5611 card. Can I run ProfiTrace on it?

NO, ProfiTrace works only with the ProfiCore hardware.

ProfiCaptain

We have slaves without switches to set the network address. Can we use ProfiCaptain to do it over the PROFIBUS?

YES, ProfiCaptain supports the SetSlaveAddress function to set the network address of DP and PA slaves.

Can I copy the GSD bitmaps into a common directory that ProfiCaptain can scan?

YES, the bitmaps associated with the GSD files must be copied manually to the \gsd directory. Do not forget to generate the catalog again.

I cannot import some GSD files. What can be the reason?

ProfiCaptain can only import GSD files with GSD revision 3 and lower. Revision 4 and 5 are not supported yet.

How can I remove a GSD file from the catalog?

To remove a GSD file from the catalog you need to manually delete the file from the GSD directory and generate the catalog again: *Settings->Generate Catalog*.

Topology scan

Will the Topology scan be able to scan through repeaters?

NO, You will not be able to scan through repeaters, but you can clearly see which devices are behind a repeater, because the cable length between them will be 0 m.

Can the Topology scan create a network drawing of the Profibus PA network?

At the moment it is only RS 485 (DP)! For PA it will be very difficult due to junction boxes and Ex barriers.

How can I exclude participants before starting the Topology Scan?

In the Network Manager you can create segments by adding repeaters to the network and dividing the devices over the segments. Select one of your segments (set current measuring point) and generate the topology. You will see that only the devices on the specific segment are visible.

Live List

In the Live List I do not see the device names, only the addresses. How can I display them?

Only when a diagnostic message is transmitted, an Ident Number can be trapped, which ProfiTrace links to a GSD file that contains the device name. You can generate a diagnostic message with ProfiCaptain. Join the network as an additional master and do a 'network scan' (in the 'Class 2 Commands'). You can of course also remove the power or connector from the device, but that is not recommended.

Why are slaves that are not in data exchange blinking in the Live List with a yellow background?

Your bus cycle is slower than the ProfiTrace update of the Live List. You should make the update time higher. You can do this in the settings menu: *Preferences->Live List settings->Assume station lost after.*

Why are some devices in the Live List blinking from Red to Green?

The blinking devices, are devices that have master and slave functionality at the same time Red means master, Green a slave in Data Exchange. Nothing is wrong. But a lot of people make mistakes with the busparameters, because they have to be identical on all masters.

PA Probe and PROFIBUS PA

I am using the PA Probe and when I trace messages I see "MBP End del." in the column "Attention". What does it mean?

It means that the PA Probe did not detect a correct MBP end delimiter. The MBP start and end delimiter are signatures used to identify the begin and end of a message on the MBP PA physical level and are additional to the start delimiter of the standard PROFIBUS message.

Can I change a device address with the PA Probe?

The PA-Probe can only listen on a PA network. So you cannot use it to change the address of your device. If your network is using transparent couplers or links, you can connect your ProfiCore to the DP-side of your network and use ProfiCaptain to change the address.

Product comparison

With other tools that use PCMCIA and PCI cards, the Live List stops when I select another function. Is this better organized with ProfiTrace?

YES, because of the ProfiTrace 2 structure everything keeps on running. You can select multiple options and processes that run separately.

Is ProfiTrace 2 the same as the Profibus Tester, PBT3 and other analyzers?

ProfiTrace 2 is much better; it combines all the other clunky and expensive tools to just 1 simple USB interface. You only have to do 1 investment to get everything and it can do a lot more. Also you have integrated master functionality that the others cannot provide.

Message Recording

Can ProfiTrace 2 decode DP-V2 messages?

YES, ProfiTrace decodes DXB, SRD_MCAST and Isochrone spare DP-V2 related functions.

In networks that still have old FMS components, will I be able to see the SAPs and hex data from messages of these components?

YES, ProfiTrace will capture and display every PROFIBUS message. So, you can inspect the SAPs and the data. Also the Live List and large parts of the statistics are useable.

Bar graph

What is the difference between 'AB Diff voltage' and 'AB Diff stable voltage'?

'AB Diff voltage' is the average amplitude of the signal and 'AB Diff stable voltage' is the minimum measured amplitude.

For the latest FAQ list check out our website!

18 Sales offices and distributors

HEADQUARTERS

PROCENTEC
Turfschipper 41
2292 JC WATERINGEN
Netherlands
Tel.: +31-(0)174-671800
Fax: +31-(0)174-671801
Email: info@procentec.com
Internet: www.procentec.com

BRAZIL

Westcon Instrument. Indl Ltda
Rual Alvaro Rodrigues, 257
São Paulo – SP
Brazil - CEP 04582-000
Tel.: +55 11 5561-7488
Fax: +55 11 5093-2592
Email: paolo@wii.com.br
Internet: www.wii.com.br

FRANCE

AGILICOM
Bâtiment B
1, rue de la Briaudière
Z.A. La Châtaigneraie
37510 BALLAN-MIRE
France
Tel.: +33 247 76 10 20
Fax: +33 247 37 95 54
Email: jy.bois@agilicom.fr
Internet: www.agilicom.fr

ARGENTINA

eFALCOM
Alcorta 2411
B1744- Moreno
Buenos Aires
ARGENTINA
Tel.: +54 237 46 31 151
Fax: +54 237 46 31 150
Email: enrique.modai@efalcom.com
Internet: www.efalcom.com.ar

CHILE

RP Ingenieria Limitada
Tucapel 92 oficina 52
Concepción
Chile
Tel.: +56-(0)41-2469350
Fax: +56-(0)41-2522592
Email: rodrigopinto@rpingenieria.cl
Internet: www.rpingenieria.cl

GERMANY

PROCENTEC GmbH
Haid-und-Neu-Str. 7
D-76131 Karlsruhe
Germany
Tel.: +49-(0)721 626 96 32
Fax: +49-(0)721 626 96 35
Email: tkarnau@procentec.com
Internet: www.de.procentec.com

AUSTRALIA

I S Systems Pty Limited
14 Laverick Ave., Tomago,
NSW, Australia, 2322
Tel.: +61 2 4964 8548
Fax: +61 2 4964 8877
Email: fritz.woller@issystems.com.au
Internet: www.issystems.com.au

CHINA

CAMETA
Training & Marketing Department
No. 1 Jiao Chang Kou - Room 407
De Sheng Men Wai
BEIJING 100011, China
Tel.: +86-10-82285088 or 62055653
Fax: +86-10-62055653
Email: training@cameta.org.cn
Internet: www.diewen.com

Brandt-Data GmbH
Friedrich-Hayn-Str. 4
D-24582 Bordesholm
Germany
Tel.: +49 (0)4322-699657
Fax: +49 (0)4322-699658
Email: hbrandt@brandt-data.de
Internet: www.brandt-data.de

Tyco Flow Control Pacific
1 Percival Road, Smithfield,
NSW, Australia, 2164
Tel.: +61 2 9612 2323
Fax: +61 2 9612 2324
Email: nhsmith@typac.com.au
Internet: www.profibuscentre.com.au

Czech Republic

FOXON e-shop
Polní 367 460 01
Liberec 12
Czech Republic
Tel.: +420 724 578 360
Fax: +420 485 353 192
Email: jaromir.peterka@foxon.cz
Internet: www.foxon.cz

profichip GmbH
Einsteinstrasse 6
D-91074 Herzogenaurach
Germany
Tel.: +49-9132-744-200
Fax: +49-9132-744-204
Email: sales@profichip.com
Internet: www.profichip.com

AUSTRIA

Dipl.Ing. Christoph Gudenus
Rotenmuehlgasse 40/5
1120 WIEN
Austria
Tel.: +43 1 812 34 20
Fax: +43 1 812 31 55
Email: office@gudenus.at
Internet: www.gudenus.at

DENMARK

HH Automation A/S
Hovedgaden 451F
DK 2640 HEDEHUSEN
Denmark
Tel.: +45 70 20 52 01
Fax: +45 70 20 52 02
Email: ph@hh-automation.dk
Internet: www.hh-automation.dk

INDIA

U L ELECTRODEVICES P LTD
NIRMAN CLASSIC ,
KATRAJ-KONDHWA ROAD,
KATRAJ, PUNE-411046
India
Tel.: +91-202 696 0050
Fax: +91-202 696 2079
Email: dileep.miskin@ulepl.com
Internet: www.ulepl.com

BELGIUM

Bintz Technics N.V.
Brixtonlaan 23,
B-1930 ZAVENTEM
Belgium
Tel.: +32 2 720 49 16
Fax: +32 2 720 37 50
Email: bloemen@bintz.be
Internet: www.bintz.be

FINLAND

Hantekno Oy
Halsuantie 2,
FIN-00421 HELSINKI
Finland
Tel.: +358 (0)9-530 66 570
Fax: +358 (0)9-530 66 530
Email: hannu.aarrelampi@hantekno.com
Internet: www.hantekno.com

IRELAND

PROFIBUS Ireland
University of Limerick
National Technology Park, Plassey
LIMERICK, Ireland
Tel.: +353-61-202107
Fax: +353-61-202582
Email: info@profibus.ie
Internet: www.profibus.ie

ITALY

C.S.M.T. Gestione S.C.A.R.L.
via Branze n. 43/45
25123 BRESCIA
Italy
Tel.: +39 030 3384030
Fax: +39 030 396999
Email: r.miglietti@csm.it
Internet: www.csm.it

JAPAN

Japanese PROFIBUS Organization
C/O Siemens K.K.
Takanawa Park Tower
3-20-14 Higashi-Gotanda,
Shinagawa-ku, TOKYO
Japan
Tel.: +81-3-5423-8628
Fax: +81-3-5423-8734
Email: shinichi.motoyoshi@siemens.com

KOREA

Hi-PRO Tech. Co., Ltd.
#812, SEOCHO PLATINUM, 1445-13,
SEOCHO-DONG, SEOCHO-GU, SEOUL,
KOREA
Tel.: +82 (0)2-522-5005
Fax: +82 (0)2-523-5149
Email: chays@hiprotech.co.kr
Internet: www.profibus.co.kr

NETHERLANDS

Ehrbecker Schiefelbusch BV
Postbus 5505
4801 DG BREDA
Netherlands
Tel.: +31-(0)76-5782860
Fax: +31-(0)76-5719261
Email: at@eselektro.nl
Internet: www.eselektro.nl

NORWAY

AD Elektronikk AS
Boks 641
N-1401 SKI
Norway
Tel.: +47 64 97 60 60
Fax: +47 64 97 60 70
Email: kai@ade.no
Internet: www.ade.no

POLAND

INTEX Sp. z o.o.
ul. Wincentego Pola 16
44-100 GLIWICE
Poland
Tel.: +48 32 230 75 16
Fax: +48 32 230 75 17
Email: intex@intex.com.pl
Internet: www.intex.com.pl

Romania

S.C. SVT Electronics S.R.L.
Brăila 7
540331 Tg-Mure
Romania
Tel.: +40 365 809 305
Fax: +40 365 809 305
Email: sajgo.tibor@svt.ro
Internet: www.svt.ro

Saudi Arabia

asm establishment
Al-Zahra Dist. – Attas st.
cross section with helmy Kutby St.
Villa no.25 Jeddah-21553
Saudi Arabia
Tel.: +966 2 691 2741
Fax: +966 2 682 8943
Email: info@asmestablishment.com
Internet: www.asmestablishment.com

SINGAPORE / South East Asia

PROCEN TEC Pte Ltd
25 International Business Park #02-78/79
German Centre
Singapore 609916
Tel.: +65-6562 8960
Fax: +65-6562 8969
Email: singapore@procentec.com
Internet: www.procentec.com.sg

ISEP (S) Pte Ltd
91 Defu Lane 10, #04-02
Swee Hin Building
Singapore 539221
Tel.: +65-63564237
Fax: +65-63467322
Email: chkoo@ise-p.com
Internet: www.ise-p.com

SOUTH AFRICA

IDX ONLINE CC
1 Weaver Street, Fourways
JOHANNESBURG
South Africa
Tel.: +27(11) 465-7916
Fax: +27(11) 465-8890
Email: daveb@idxonline.com
Internet: www.idxonline.com

SPAIN and PORTUGAL

ER-SOFT, SA
Av. Constitucion, 4
E-28230 Las Rozas,
MADRID,
Spain
Tel.: +34 916.408.408
Fax: +34 916.408.409
Email: info@er-soft.com
Internet: www.er-soft.com

SWEDEN

P&L Nordic AB
Box 252,
S-281 23 HÄSSLEHOLM
Sweden
Tel.: +46 451 74 44 00
Fax: +46 451 89 833
Email: hans.maunsbach@pol.se
Internet: www.pol.se/profibus

SWITZERLAND

Hochschule für Technik und Informatik
PROFIBUS Kompetenzzentrum
Jicoweg 1
CH-3400 BURGDORF
Switzerland
Tel.: +41 (0) 34 426 68 32
Fax: +41 (0) 34 426 68 13
Email: max.felser@bfh.ch
Internet: www.profitrace.ch

Endress+Hauser Process Solutions
Kägenstrasse 2
CH-4153 REINACH / BL1
Switzerland
Tel.: +41 (0) 61 715 73 00
Fax: +41 (0) 61 715 73 01
Email: michael.ulrich@solutions.endress.com
Internet: www.solutions.endress.com

TAIWAN

Full Data Technology
6F., No.200, Gangqian Rd.,
Neihu District, Taipei City
114, Taiwan
Tel.: +886-2-87519941/9097
Fax: +886-2-87519533
Email: sales@fulldata.com.tw
Internet: www.fulldata.com.tw

TURKEY

Emikon Otomasyon
DES Sanayi sitesi 103 sokak B-7 blok No:16
Yukari Dudullu / Umraniye
Istanbul 34776
Turkey
Tel.: +90 216 420 8347
Fax: +90 216 420 8348
Email: tolgaturunz@emikonotomasyon.com
Internet: www.emikonotomasyon.com

UNITED ARAB EMIRATES

Adaptive Measuring and Control
P.O Box-123759 Unit No.424,
Al Diyafah Building, Al- Diyafah Street,
Satwa Dubai,
United Arab Emirates
Tel.: +971-4-3982760
Fax: +971-4-3982761
Email: scsanu@emirates.net.ae

UNITED KINGDOM

Safronics Limited
Pearson Street, Leeds
LS10 1BQ
United Kingdom
Tel.: +44 (0)113 245 7170
Fax: +44 (0)113 236 4010
Email: ian.robinson@safronics.co.uk
Internet: www.safronics.co.uk

iTech
Unit 1
Dukes Road
Troon, Ayrshire KA10 6QR
United Kingdom
Tel.: +44 (0)1292 311 613
Fax: +44 (0)1292 311 578
Email: sales@itech-troon.co.uk
Internet: www.itech-troon.co.uk

Hi-Port Software Limited
The Hub 2 Martin Close
Lee-on-Solent, Hampshire
PO13 8LG,
United Kingdom
Tel.: +44 (0)8452 90 20 30
Fax: +44 (0)2392 552880
Email: sales@hiport.co.uk
Internet: www.hiport.co.uk

Verwer Training & Consultancy
5 Barclay Road
Poynton
Stockport
Cheshire SK12 1YY
United Kingdom
Tel.: +44 (0)1625 871199
Email: andy@verwertraining.com
Internet: www.verwertraining.com

Parkelect LTD
84 Dargan Road
Belfast
BT3 9JU
N. Ireland
Tel.: +44 2890 777743
Fax: +44 2890 777794
Email: jgillan@parkelect.co.uk
Internet: www.parkelect.co.uk

UNITED STATES

Grid Connect Inc.
1630 W. Diehl Road
Naperville, Illinois 60563
USA
Tel.: +1 630 245-1445
Fax: +1 630 245-1717
Email: sales@gridconnect.com
Internet: www.factorycomm.com




URUGUAY

ZyTECH (Kuolong s.r.l.)
Cerro Largo 788 Bis
11100 Montevideo
Uruguay
Tel.: +598 2 901 3311
Fax: +598 2 901 3311
Email: javier@zytech.com.uy
Internet: www.zytech.com.uy

VIETNAM

Bavitech Corporation
42 Truong Son Street
Ward 2, Tan Binh District
Ho Chi Minh City
Vietnam
Tel.: +84-8-3547 0976
Fax: +84-8-3547 0977
Email: hai.hoang@bavitech.com
Internet: www.bavitech.com

19 Order codes

Component	Order code	Remarks
 ProfiTrace 2	30020	<ul style="list-style-type: none"> • ProfiCore Ultra • USB cable • ProfiTrace 2 (no oscilloscope, bar graph and topology scan function) - can be upgraded later!
 Troubleshooting Toolkit Ultra Plus	37021	<ul style="list-style-type: none"> • ProfiCore Ultra • USB cable • ProfiTrace 2 • ScopeWare • Bar graph • Topology Scan • Reporting • Tap Connector • Blue carrying case
 Troubleshooting Toolkit Ultra Pro	38022	<ul style="list-style-type: none"> • ProfiCore Ultra • USB cable • ProfiTrace 2 • ScopeWare • Bar graph • Topology Scan • Reporting • Tap Connector • Blue carrying case • OPC server • PA Probe Ultra • ProfiCaptain
Topology scan license	26010	License for existing customers (already included in the Toolkit Ultra PRO)
OPC server license	101-00231B	License for existing customers (already included in the Toolkit Ultra PRO)
Calibration service	101-00012B	
Manual pack	18010	<ul style="list-style-type: none"> • 5 Paper manuals • Latest software CD

20 Contents of the Troubleshooting Toolkit

PROFIBUS Troubleshooting Toolkit Ultra PRO (38022)

- ☐ ProfiCore Ultra
- ☐ USB cable (A to B)
- ☐ USB cable (A to mini, for extra power supply if needed)
- ☐ CD-ROM (download your license on www.procentec.com/licenses)
- ☐ Tap Connector
- ☐ Manual
- ☐ Pen
- ☐ PA Probe Ultra, including 2 spare connectors (green)

PROFIBUS Troubleshooting Toolkit Ultra Plus (37021)

- ☐ ProfiCore Ultra
- ☐ USB cable (A to B)
- ☐ USB cable (A to mini, for extra power supply if needed)
- ☐ CD-ROM (download your license on www.procentec.com/licenses)
- ☐ Tap Connector
- ☐ Manual
- ☐ Pen



21 Glossary

Address	Unique number of a device connected to the network. With PROFIBUS this can be 0 to 126. 127 is a broadcast address.
Analyzer	Software tool to observe the protocol traffic. Combi-Analyzers can also inspect the signal quality. Other term: Bus Monitor. Example: ProfiTrace.
Bit Time (TBit)	To help simplify timing calculations, it is convenient to normalize the time units. One Bit Time is the time it takes to transmit one bit and is the reciprocal of the baudrate and is calculated as follows; $T_{Bit} = 1 \text{ (bit)} / \text{baudrate (bps)}$. Examples: 12 Mbps --> $T_{Bit} = 83 \text{ ns}$ 1,5 Mbps --> $T_{Bit} = 667 \text{ ns}$
Busparameters	Settings that define the timing behaviour on the bus. They are defined in the master. Examples: Tslot, MaxTSDR.
C	Capacitance.
Class 1 master	A class 1 master is normally a PLC or DCS system. The class 1 master handles the cyclical Data Exchange with the slaves assigned to it.
Class 2 master	A class 2 master is usually a laptop or programming console that is provided for commissioning, maintenance or diagnostic purposes.
Data Exchange	The state of a slave after parameterization and configuration has been completed, in which it cyclically exchanges I/O data with the master. Normally the slave stays forever in Data Exchange until the bus communication or device are stopped.
DGND	Digital Ground.
DIN	German Institute for Standardization (www.din.de).
DP-V0	DP-V0 is the basic stage of the PROFIBUS DP communication protocol. DP-V0 devices (master and slaves) perform the following basic functionalities: - Cyclic exchange of I/O data between controlling and slave devices - Device, Identifier (module) and Channel related Diagnosis - Parameterization of DP-slaves - Configuration of DP-slaves

DP-V1	<p>DP-V1 is the first extension of PROFIBUS DP-V0. DP-V1 devices comply with the following features:</p> <ul style="list-style-type: none"> - Device related diagnosis is replaced by status and alarms. - The first three octets of the user parameterization data are standardized. <p>Optionally these devices may support:</p> <ul style="list-style-type: none"> - Acyclic communication (MS1, MS2). - If alarms are used, MS1 is supported.
DP-V2	<p>DP-V2 is the second stage of extension of PROFIBUS DP after DP-V1. DP-V2 devices shall comply with the following features:</p> <ul style="list-style-type: none"> - Data Exchange Broadcast (DxB) for slave to slave communication (publisher/subscriber principle). - Isochronous Mode (time tick synchronized operating slaves, e.g. drives) - Up- and/or download of Load Region Data (domains) - Clock Control (synchronization within slaves) and Time Stamping - Redundancy.
Drop cable	See <i>Spur line</i> .
DSAP	See <i>SAP</i> .
ED	See <i>End Delimiter</i> .
Electromagnetic Compatibility	See <i>EMC</i> .
EMC	<p>The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other countries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.</p>
End Delimiter	This byte identifies the end of a PROFIBUS message and has a fixed value of 16 Hex.
FC	See <i>Frame Control</i> .
FCS	See <i>Frame Check Sequence</i> .
FDL	Fieldbus Datalink Layer. Layer 2 of PROFIBUS.
Frame Check Sequence	<p>It is a field in the PROFIBUS message that holds a checksum to check the integrity of the message. It is simply the sum of the bytes. $\text{Checksum} = (\text{DA} + \text{SA} + \text{FC} + \text{DU}) \bmod 256$. This is simply the bytes added together and divided by FF Hex (255). This is an integrated function that is normally performed by the PROFIBUS ASIC.</p>

Frame Control	The Frame Control field specifies the type of message (request, response, acknowledgement), type of station (passive or active/slave or master), priority and acknowledgement (successful or unsuccessful).
GSD file	Generic Station Description. It is provided by the device manufacturer and contains a description of the PROFIBUS DP/PA device. GSD files provide a way for an open configuration tool to automatically get the device characteristics.
HAS	Highest Station Address The highest address to which the master will look for new masters. This is done with the FDL Status message. It has nothing to do with the configured slaves! Default value is 126, but the end user can decrease it to a lower value. We recommend leaving it on 126 in order to display not configured slaves in the Live List. This value does not influence the I/O cycle time of the network.
Hub	A Hub refreshes a signal and passes the information on to all nodes which are connected to the Hub. Data frames which were received on one port are transferred to all the other ports (chicken foot topology).
Ident Number	The primary slave device identification is an Ident Number. This is a unique 16 bits number assigned by the PNO. It is stored within the device and defined in the corresponding GSD file. In addition it is part of the GSD file name. At runtime the Ident Number is used within the; <ul style="list-style-type: none"> - Set slave address procedure - Parameterization telegram (byte 5 + 6) - Standard part of a diagnosis message (byte 5 + 6) The Ident Number can be retrieved from a device. Its main purpose is to make sure that a GSD file and configuration/parameterization data between master class 1 and its slave are matching.
LE / LEr	This byte specifies the length of a PROFIBUS message with variable data length (SD2 frame). It is counted from the DA byte to the end of the Data Unit. The range is 4 to 249. LE is repeated in the LEr field for redundant data protection.
Live List	The Live List is a matrix that lists all the available devices. It is directly visible which devices are 'troublemakers'. With different background colours the status of the devices is displayed. The Live List can also generate the product name of the devices when a diagnostic message is captured (synchronized with the GSD library).
MPI	Multiple Protocol Interface. Protocol defined by Siemens which uses the layer 1 and 2 of PROFIBUS (FDL).
PA	See <i>PROFIBUS PA</i> .
PCB	Printed Circuit Board.

PI	<p>PROFIBUS International. The International PROFIBUS Organization based in Karlsruhe.</p>
PNO	<p>PROFIBUS Nutzer Organization. The German PROFIBUS Organization based in Karlsruhe.</p>
PROFIBUS DP	<p>Acronym for "PROFIBUS for Decentralized Peripherals". Specification of an open fieldbus system with the following characteristics:</p> <ul style="list-style-type: none"> - Polling master-slave-system (cyclic communications, MS0) - Flying masters with robin round token passing coordination (MM) - Connection based (MS1) and connectionless (MS2, MS3) acyclic communication between masters and slaves <p>Options (e.g.):</p> <ul style="list-style-type: none"> - Data exchange broadcast (DXB), i.e. slave to slaves communication - Isochronous mode of slaves - Clock synchronization - Redundancy <p>PROFIBUS DP is standardized within IEC 61158 and IEC 61784, communication profile families 3/1 and 3/2 The term "PROFIBUS DP" also is a synonym for the RS485 based deployments within factory automation.</p>
PROFIBUS PA	<p>Acronym for "PROFIBUS for Process Automation". This is an application profile based on PROFIBUS DP independent from the physical profiles (RS485, Fiber Optics, MBP). The requirements of continuous manufacturing are covered within the application profile "PA-Devices" and the extension MBP to the physical profiles.</p>
Reflection	<p>Part of the original signal that is transmitted back along the cable. It corrupts the original signal.</p>
Repeater	<p>Active physical layer device that receives and retransmits all signals over a different port to increase the distance and number of devices for which signals can be correctly transferred for a given medium.</p>
SAP	<p>Service Access Point. This is a defined code/command that tells the slave what data is to be transmitted or which function is to be performed. There are always 2 SAPs in a message; SSAP (Source Service Access Point) and/or DSAP (Destination Service Access Point). The SAPs are located on the first 2 bytes of the data unit in the SD2 message. Other message types do not carry SAPs. PROFIBUS DP-V0 uses SSAP 62 and DSAP 54 to 62. Example: 62-60 = Get Diagnostics, 62-61 Set Parameters Data Exchange messages do not use SAPs.</p>
SDA	<p>Send Data with Acknowledge. Used with PROFIBUS FMS to sent data to a device and receive a short acknowledgement as response. NOT use by PROFIBUS DP and PA.</p>
SDN	<p>Send Data with No acknowledge. This service is used when a broadcast is sent to a group of slaves (multi-cast) or all slaves (broadcast). The slaves do NOT respond or acknowledge broadcast or multi-cast messages.</p>

Spur line	A cable attached to a bus segment with a T-connection . Spurs are not recommended with PROFIBUS DP. They are prohibited with 12 Mbps and PROFIsafe operations. German term is "Stichleitung".
SSAP	See SAP.
Stub line	See <i>Spur line</i> .
Tap Connector	A small cable to connect the ProfiCore to a PROFIBUS DP network. It has been designed NOT to cause network disturbances due to spur lines. A perfect vertical position for the ProfiCore is obtained that does not overpressure the piggy back plug which is attached to the DP network. The cable is of the flexible type so you can move it to all directions.
Tbit	See <i>Bit Time</i> .
Termination	A (powered) resistor network at both ends of a segment to prevent reflections (with PROFIBUS DP the termination has to be powered).
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.

22 About PROCEN TEC

PROCEN TEC is an independent company, concentrating all its products and services on PROFIBUS and PROFINET technology. Our main business is the export of in-house developed automation products through our worldwide distributor network. PROCEN TEC is also providing vendor independent training and support to end-users.



We are an international PROFIBUS and PROFINET Competence/Training Center with all the required expertise available to realize our projects and services. We have the availability of some real experts whose knowledge makes us unique in the world. Because of our international recognition we are often contracted and offer a wide range of commercial services (consultancy, training, commissioning, maintenance and troubleshooting). PROCEN TEC has 3 offices; the headquarters is based in The Netherlands and sales offices are located in Germany and Singapore.

Testlab

PROCEN TEC runs 1 of the 8 accredited test laboratories for the certification of PROFIBUS devices. In our laboratory vendors can have their products tested on PROFIBUS compatibility.

Product development and export

We develop in house PROFIBUS and PROFINET products that are being exported through our worldwide distributor network. Especially in the area of maintenance tools we have gained a unique market position.

Democenter

We have a demonstration facility, which is used for support, training, demonstrations, engineering and trade fairs. It consists of more than 250 devices from more than 40 vendors.

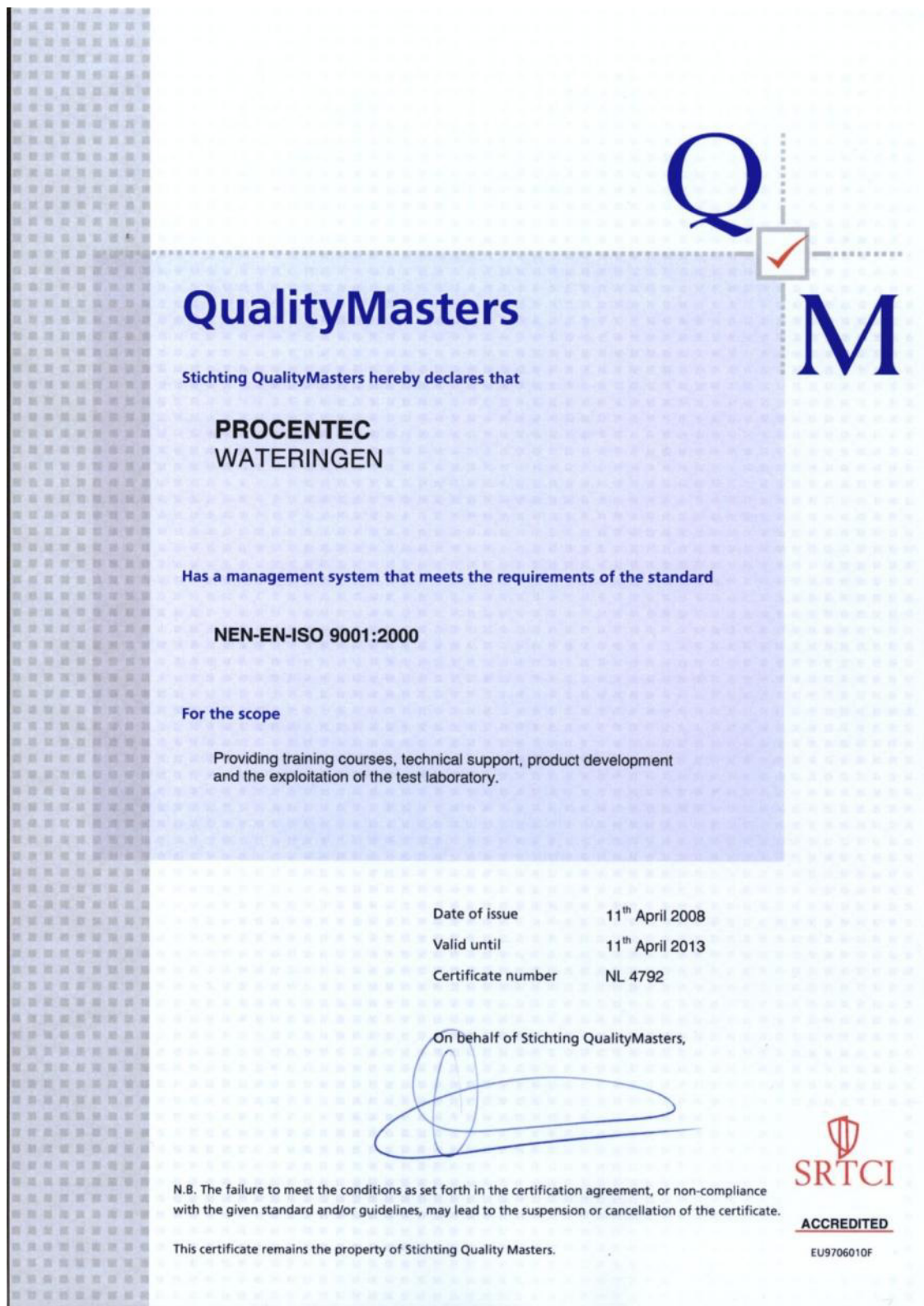
Training and Education

PROCEN TEC is very successful with its training program. Up to now, more than 4000 participants have received a certificate. The costs incurred for engineering, assembly, commissioning and maintenance always play a key role when choosing a fieldbus. We train our participants that the implementation of PROFIBUS and PROFINET can help to cut costs in all areas. Our practical experience is the key factor! PROCEN TEC offers different types of PROFIBUS and PROFINET training modules which are organised on a regular basis.

PROCEN TEC is a professional organisation, which is involved in PROFIBUS and PROFINET technology 24-hours a day. It has the availability of experts who are constantly deployed worldwide. Not only is the tried and tested automation technology ideal for the use in both Factory and Process automation, but support is also ensured through the products and services of PROCEN TEC.

www.procentec.com

23 Certificates





Certificate for a PI Competence Center

PI confirms that

**PROCEN^{TEC}
Dennis van Booma
Turfschipper 41
2292 JC Wateringen
THE NETHERLANDS**

*is a fully accredited
PI Competence Center for PROFIBUS basic and
PROFIBUS PA.*


*This certificate is granted according to the Quality of Services
Agreement for PI Competence Centers and is valid for 2 years,
until December 31, 2009.*

Karlsruhe, May 05, 2008




.....
(Official in Charge)

Chairmen of PI


Michael Bryant (Chairman)


Jörg Freitag (Deputy Chairman)



Certificate

Authorization as PI Test Laboratory for PROFIBUS

PROFIBUS Nutzerorganisation e.V. accepts
PROCEN^{TEC}
Dennis van Booma
Turfschipper 41
2292 JC WATERINGEN
NETHERLANDS

as authorized PI Test Laboratory for:

PROFIBUS Devices.

The authorization is based on the assessment report dated March 06, 2009.

The execution of the tests aimed in the PROFIBUS certification shall be conform to the PROFIBUS Standard and the valid guidelines.

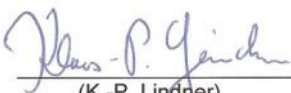
This authorization is valid until December 31, 2010.




(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.


(J. Freitag)


(K.-P. Lindner)

24 Revision History

Version 2.3

- Updated the Installation chapter.
- Updated the Distributors chapter.
- Updated the Training chapter.

Version 2.4

- Updated the Product description chapter.
- Updated the Certificates.
- Updated about PROCEN TEC.
- Updated Distributor and sales offices list.
- Updated the FAQs.

Version 3.0

- Updated about PROCEN TEC.
- Updated the product description chapter.
- Updated the quick start chapter.
- Updated the contents of the troubleshooting toolkit.
- Updated the order codes.

Version 3.1.0

- Added the ProfiCaptain chapter
- Updated Distributor and sales offices list
- Updated the Introduction chapter
- Updated the Order Codes
- Updated the FAQs
- Updated the Quick Start
- Updated the Installation chapter
- Updated the Glossary

Version 3.2.0

- Added the OPC Server chapter
- Updated the ProfiCore Ultra chapter
- Updated the Product description chapter
- Updated the Quick start chapter
- Updated the ProfiCaptain chapter
- Updated the Technical data PA Probe Ultra chapter
- Updated the Oscilloscope measurements (RS 485 – DP) chapter
- Updated the FAQ chapter
- Updated the Distributor and sales offices list
- Updated the Order codes

25 Next versions

- Extended chapter on report generation.
- Characteristics of the PB interface
- ProfiCore - LEDs
- Commissioning checklist
- Form for mailing list registration
- Form for Bug reports / Product improvement
- Topology scan in a passive installation
- Table with file extensions
- Exercises with ProfiCaptain
- ProfiCaptain – DP-V1
- Saving ProfiCaptain projects
- Measurement examples: spur lines
- Measurement examples: wrong cable
- Rotating message buffer

Glossary

- Retries
- I&M
- MBP
- SRD
- Implementation type
- Model Name
- Vendor Name

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Other PROCENTEC products

PROFINET Cable Tester

- ✓ Suitable for 4- and 8-wire PROFINET and regular Ethernet cables
- ✓ Suitable for straight and 90°, metal or plastic PROFINET plugs
- ✓ Tests cable shielding
- ✓ Detects short circuits, wire breaks, swaps, miswiring and split pairs
- ✓ Large LCD clearly indicates the test results
- ✓ 150 hours on one 9 V battery
- ✓ Operating temperature: 0 to 50 °C
- ✓ Just 1-key-press to start continuous testing
- ✓ It can also test telephone and coax cable



www.profinetcabletester.com



Compact PROFIBUS Repeater

- ✓ Single channel PROFIBUS repeater
- ✓ Transparent
- ✓ Increased signal strength
- ✓ Max. 12 Mbps
- ✓ Auto baudrate detection
- ✓ Redundant power supply
- ✓ Digital glitch filtering
- ✓ No limit in cascading
- ✓ Integrated switchable termination
- ✓ Diagnostic LEDs
- ✓ DB9 connector for measurements
- ✓ IP 20 with DIN-rail mounting

www.procentec.com/profihub/b1/en

Other PROCENTEC products



ProfiHub B5

- ✓ 5 Isolated channels
- ✓ Transparent
- ✓ Increased signal strength
- ✓ 31 devices per channel
- ✓ Max. 12 Mbps
- ✓ 1200 m spur line length
- ✓ No address required
- ✓ Integrated switchable termination
- ✓ LEDs to indicate termination is ON
- ✓ Screw terminals and DB9 connectors
- ✓ IP 20 with DIN-rail mounting

ProfiHub A5

- ✓ 5 Isolated channels
- ✓ Transparent
- ✓ Increased signal strength
- ✓ 31 devices per channel
- ✓ Max. 12 Mbps
- ✓ 1200 m spur line length
- ✓ No address required
- ✓ Integrated switchable termination
- ✓ IP 65 classification



www.procentec.com/profihub

PROCENTEC
Turfschipper 41
2292 JC WATERINGEN
The Netherlands

Tel.: +31-(0)174-671800
Fax: +31-(0)174-671801
Email: info@procentec.com
Web: www.procentec.com